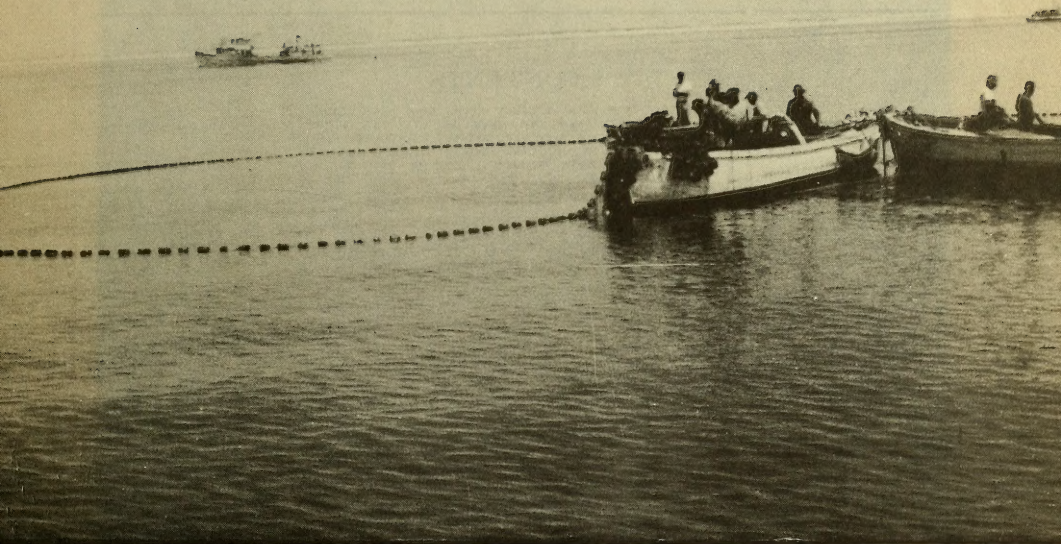
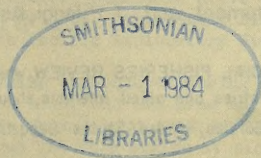


*Fishes*

# COMMERCIAL FISHERIES REVIEW



Vol. 12, No. 6

JUNE 1950

FISH and WILDLIFE SERVICE  
United States Department of the Interior  
Washington, D.C.



# COMMERCIAL FISHERIES REVIEW



A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES  
PREPARED IN THE BRANCH OF COMMERCIAL FISHERIES

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# COMMERCIAL FISHERIES REVIEW

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## "JOHN N. COBB" USES NEW RIG FOR SLOW-SPEED TROLLING

By Sheldon W. Johnson\*

A power take-off from an auxiliary engine to drive the vessel at slow speeds is a special feature of the John N. Cobb, exploratory fishing vessel of the U. S. Fish and Wildlife Service's North Pacific Exploratory Fishery Program.

In the various types of fishing encountered during exploratory work, such as, towing shrimp trawls and plankton nets, and trolling for fish other than tuna, it is necessary to operate at speeds from  $\frac{1}{2}$  knot to 3 knots for extended periods of time. While it is possible to run the main engine at slow speed, it is not recommended practice for prolonged periods as it results in fouling.

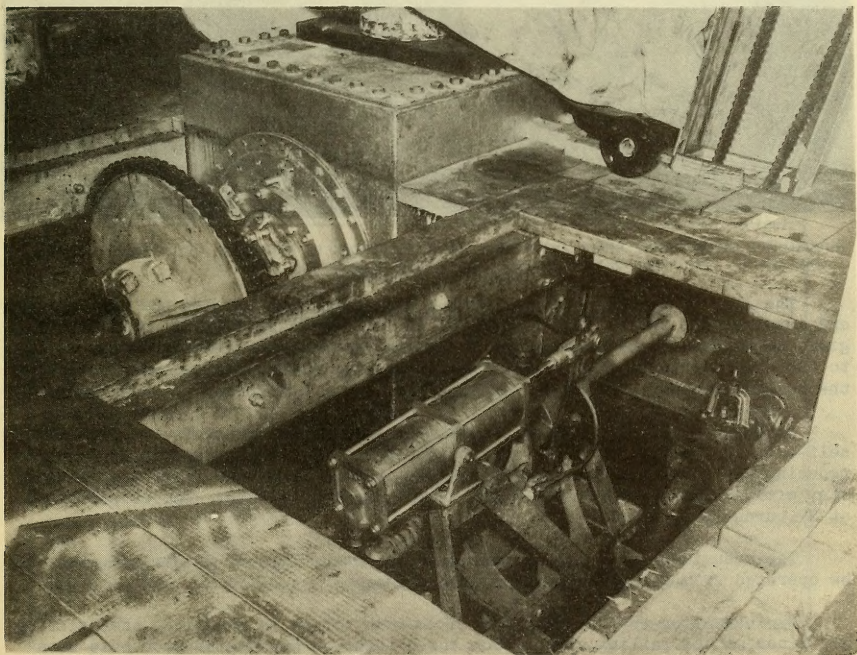


FIGURE 1 - THE JOHN N. COBB'S MAIN SHAFT AND SPROCKET AT LEFT. THE AIR RAM CONTROLLING THE CLUTCH ON THE REDUCING GEARS ON THE LOWER RIGHT. CHAIN DRIVE AND SHAFT FROM AUXILIARY ENGINE IN BACKGROUND.

\*Master, John N. Cobb, exploratory fishing vessel, North Pacific Exploratory Fishery Program, U. S. Fish and Wildlife Service, Seattle, Wash.

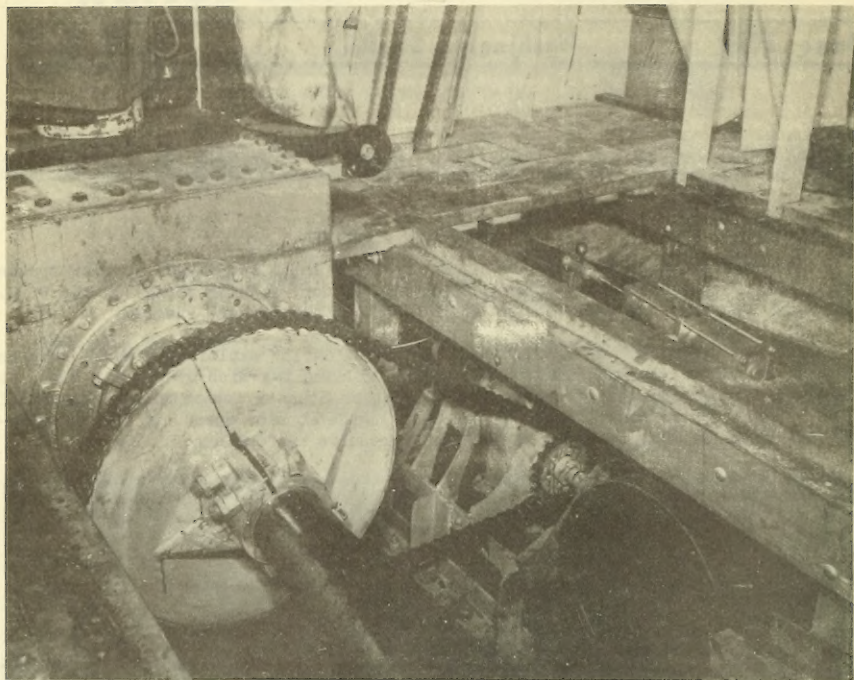


FIGURE 2 - INTERMEDIATE SHAFT AND 7 TO 1 REDUCING SPROCKETS CONNECTED WITH REDUCING GEARS AND CLUTCH. AIR RAM CONTROLLING THE REDUCING CLUTCH ON THE RIGHT.

The John N. Cobb is equipped with a sailing clutch between the main engine and intermediate shaft. The fishing winch is powered by a Diesel auxiliary engine, through a torque converter. Therefore, it was a relatively simple matter to tie the power from the auxiliary engine to the intermediate shaft, disengage the sailing clutch, and have a flexible slow-speed operation.

A chain and sprocket drive is employed from the winch shaft to a 3 to 1 self-contained reducing clutch and reverse gear. Power is transmitted from the reducing clutch to the intermediate shaft via chain and 7 to 1 reducing sprockets, with a shaft speed from 0 turns to 85 turns per minute. The ship's speed at 80 turns is 3 knots.

The reducing clutch and reverse gear are controlled by an air ram which may be operated from the pilothouse or engine room.

By installing two quick-change, cross-over valves in the line, the existing air lines to the sailing clutch from the pilothouse and engine room have been made to do double service.



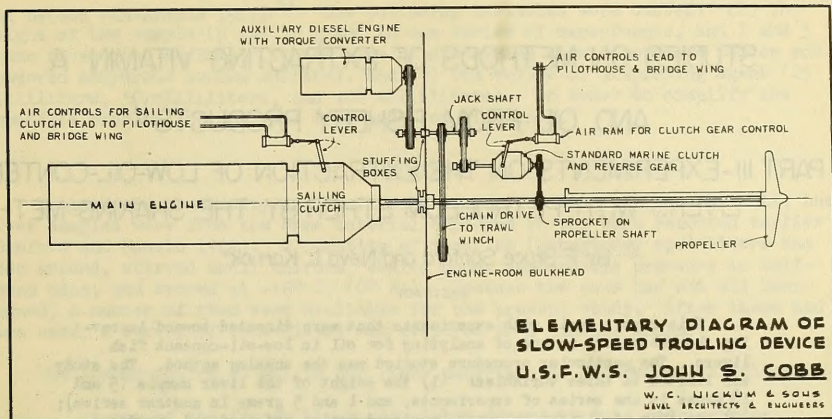


FIGURE 3 - ELEMENTARY DIAGRAM OF SLOW-SPEED TROLLING DEVICE.

The whole installation was kept simple with a minimum number of parts.

A further feature of the installation is that it could be used to furnish emergency motive power in the event of main-engine failure.



## "S.S. PACIFIC EXPLORER"

### Part IV—Personnel and the Movement of Materials

The improved techniques of the purse seiners and the use of larger vessels and nets are becoming increasingly effective for the capture of tuna. The success of the purse-seine method depends on the finding of sizable schools of tuna near the surface which are sufficiently quiescent to be captured. The purse-seine method of fishing is not dependent on supplies of bait and offers a definite promise for the development of a truly high seas tuna fishing and mother ship operation. Of the vessels fishing for the Pacific Explorer, the purse seiners, as a group and for their period of operation, were far more successful in catching tuna than the bait boats. While the purse seiners were quite successful during the spring, there may be other seasons of the year, however, when the tuna will be extremely difficult to capture by this method.

--Fishery Leaflet 326

## STUDIES ON METHODS OF EXTRACTING VITAMIN A AND OIL FROM FISHERY PRODUCTS<sup>1/</sup>

### PART III-EXPERIMENTS ON THE EXTRACTION OF LOW-OIL-CONTENT LIVERS WITH PETROLEUM ETHER BY THE SHAKING METHOD

By F Bruce Sanford and Neva L. Karrick\*

#### ABSTRACT

This report deals with experiments that were directed toward improving the laboratory method of analyzing for oil in low-oil-content fish livers. The particular procedure studied was the shaking method. The study was limited to three variables: (1) the weight of the liver sample (5 and 18 grams in one series of experiments, and 1 and 5 grams in another series); (2) the type of dispersing agent (powdered pumice and powdered anhydrous sodium sulfate); and (3) the volume of dispersing agent (25, 50, and 100 milliliters). A better dispersion of the ground liver was obtained with the pumice than with the anhydrous sodium sulfate. Fifty milliliters of dispersing agent appeared to be about the optimum volume to use with 50 milliliters of petroleum ether and a shaking bottle of 180-milliliters capacity. The liver samples weighing 5 grams were more thoroughly extracted than those weighing 18 grams; and the samples weighing 1 gram were more thoroughly extracted than those weighing 5 grams. The clumping of the liver material appeared to decrease the amount of oil extracted.

#### INTRODUCTION

Because of the decrease in the abundance of soupfin and certain other sharks, the livers of food fish are becoming increasingly important as sources of natural vitamin A. In contrast to the livers of most sharks, the livers of food fish usually have a low content. The rapid method of analysis (Anonymous 1947) for oil and vitamin A that was developed for shark livers is not suitable for livers that contain only a small amount of oil. Therefore, a rapid method of assay is needed for the low-oil-content livers.

The purpose of these experiments was to obtain data that may ultimately result in the development of the needed method. The observations reported here are part of a series of studies being conducted to investigate the factors involved in the solvent extraction of oil and vitamin A from low-oil-content livers for analytical purposes. This particular group of experiments applies to the shak-

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<sup>1/</sup> Part I - "Vitamin A Potencies of Oil from Grayfish Livers Obtained by Extraction with Petroleum Ether and by Cooking with Water," by D. Miyauchi and F. B. Sanford, appeared in *Commercial Fisheries Review*, September 1947, Vol. 9, No. 9, and also as Separate No. 186. Part II - Experiments on the Solvent Extraction of Low-Fat Livers, appeared in same Review, February 1949, Vol. 11, No. 2, and also as Separate No. 224.



ing method (Anonymous 1947).<sup>2/</sup> The following variables were tested: (1) the weight of the sample (5 and 18 grams in one series of experiments, and 1 and 5 grams in another series), (2) the type of dispersing agent (powdered pumice and powdered anhydrous sodium sulfate), and (3) the volume of dispersing agent (25 milliliters, 50 milliliters, and 100 milliliters). In order to simplify the immediate problem, no analyses were made for vitamin A.

### PROCEDURE

To maintain continuity and facilitate comparison with previous results, the liver samples were from the same material employed in the work reported earlier (Sanford and Manalo 1949). A quantity of rockfish (*Sebastes* sp.) livers had been ground, stirred until uniform, sealed under atmospheric pressure in half-pound cans, and stored at  $-18^{\circ}$  C. ( $0^{\circ}$  F.). Because the cans had not all been opened, a number of them were available for the present study. After these had been used, a series of sole livers was prepared in a similar manner.

The concentration of oil in the liver material was determined as follows:

A can of the frozen liver was placed overnight in a refrigerator maintained at a temperature slightly above freezing. On the following morning, the material was removed from the can and blended for 3 minutes in a Waring Blendor. A portion (approximately 1, 5, or 18 grams, depending upon the experiment) of the material was transferred to a tared, square, 180-milliliter bottle, and the bottle and its contents were accurately weighed. Exactly 50 milliliters of petroleum ether (bp  $35^{\circ}$  -  $60^{\circ}$  C.) and the desired volume (25, 50, or 100 milliliters) of dispersing agent (powdered pumice or powdered anhydrous sodium sulfate) were added to the bottle. It was corked, machine-shaken for one hour (144 one-inch strokes a minute), and centrifuged. A 10-milliliter aliquot portion was then pipetted into a tared beaker and the solvent was evaporated by placing the beaker on a wire screen suspended above an electric hot plate. Three minutes after the solvent had disappeared, the beaker was removed, allowed to cool, and weighed. The oil content of the sample was then calculated.

The choice of 5 and 18 grams as the sample weights to be studied in the first series of experiments, although somewhat arbitrary, was based upon the following considerations:

The sample should be large enough that the extra precautions required in micro techniques need not be employed. On the other hand, the dimensions of the shaking bottle imposed an obvious upper limit on the size of the sample. Another consideration was that the samples must be sufficiently different in weight so that, if sample size was a significant variable, this fact would become apparent from the data. Previous work with the liver material indicated that 5 and 18 grams would be satisfactory weights. The choice of 1 and 5 grams in the second series

<sup>2/</sup> The shaking method employs the following procedure: A weighed sample of liver is shaken in a bottle with a measured volume of solvent and a desiccant or a dispersing agent. The bottle and its contents are centrifuged and an aliquot portion of the supernatant solution is taken by means of a pipet. The weight of oil obtained, after the solvent in the aliquot portion is evaporated, gives the remaining datum necessary for the calculation of the liver oil concentration. A second aliquot portion, suitably diluted with isopropanol, is taken for a determination of optical density by means of a spectrophotometer. The vitamin A potency of the oil can then be calculated from the resulting data.

of experiments was based upon similar reasoning. It was realized, however, that the results with the 1-gram samples would be more variable than those with the 5-gram samples. To compensate somewhat for the decrease in precision, the number of replicate samples in the second series was increased to 10.

Because the blended liver material was fluid, the sample was transferred from the blender jar to the shaking bottle, using a pipet constructed from glass tubing one centimeter in diameter. Markings on the pipet indicated the volume of liver material needed to obtain samples fairly reproducible in weight.

### DISCUSSION

If anhydrous sodium sulfate is placed in the shaking bottle before the petroleum ether is added to it, the liver material tends to form clumps or balls when the bottle is shaken. This results in less efficient extraction of oil from the liver. The order of addition of the pumice and solvent, however, appears to make no difference because there is little tendency for the pumice to cause balling of the liver particles. If the dispersing agent can be placed in the bottle before the solvent, the manipulative procedure can be slightly improved because the possibility of losing the solvent by evaporation is decreased. Therefore, when powdered pumice was used as the dispersing agent, it was added before the petroleum ether; when anhydrous sodium sulfate was used, it was added after the petroleum ether.

The amount of a powder is usually measured by weight. In experiments reported here, however, the amounts of powder were measured more conveniently by volume.

The data in Table I indicate that, under the conditions of the experiments, oil was more completely extracted from the 5-gram samples of liver than from the 18-gram samples. The effect of changing the sample weight from 5 grams to 18 grams was somewhat more noticeable if powdered anhydrous sodium sulfate was used as the dispersing agent than if powdered pumice was used.

The pumice appeared to be a more effective dispersing agent than the sodium sulfate. Increase in sample size accentuated the difference in the apparent effectiveness of the two dispersing agents.

Table 1 - The Apparent Oil Concentration in Liver of Low-Oil-Content (Rockfish, *Sebastes* sp.) as Determined From 5- or 18-Gram Samples, Using Varied Quantities of Powdered Pumice or Powdered Anhydrous Sodium Sulfate to Disperse the Liver Material

Weight of liver sample	Volume of pumice added	Volume of anhydrous sodium sulfate added	APPARENT CONCENTRATION OF OIL IN SAMPLE																	
			Replicate Sample Number								Average of replicates									
			1		2		3		4				5		6		7		8	
			Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Grams	Milliliters	Milliliters																		
5	25	0	11.2	14.5	16.0	16.3	15.3	16.0	16.7	16.3	15.3									
18	25	0	3.9	16.1	15.8	16.2	14.9	10.2	17.1	13.1	14.8									
5	50	0	17.1	17.4	17.1	17.1	17.2	17.1	15.8	16.7	17.1									
18	50	0	11.4	12.8	16.0	15.6	15.9	11.9	12.6	11.0	13.4									
5	100	0	17.5	16.0	16.2	15.2	15.3	16.9	12.8	16.9	15.6									
18	100	0	9.8	8.8	15.7	15.5	12.0	9.4	16.0	11.9	12.4									
5	0	25	12.7	12.6	11.1	10.8	13.4	14.6	13.6	11.4	12.5									
18	0	25	8.2	2.5	-	1.3	1.9	4.9	1.8	7.8	4.1									
5	0	50	14.0	12.3	16.2	14.7	15.6	15.7	15.9	16.7	15.2									
18	0	50	7.6	6.6	6.8	8.5	8.6	11.8	5.6	5.8	7.7									
5	0	100	13.2	-	12.6	12.8	11.7	14.9	16.2	16.6	14.0									
18	0	100	6.0	7.3	12.3	9.8	12.0	10.9	7.0	7.3	9.0									



With 5-gram liver samples, 50 milliliters of dispersing agent (pumice or anhydrous sodium sulfate) was better than either 25 or 100 milliliters. With 18-gram samples, the optimum volume of dispersing agent appeared to vary with the type of agent. Thus, with pumice, the use of 25 milliliters appeared to result in better extraction than did the use of 50 or 100 milliliters; on the other hand, the use of 100 milliliters of anhydrous sodium sulfate appeared to result in better extraction than did the use of 25 or 50 milliliters. Inasmuch as the 18-gram liver samples could not be extracted efficiently, no attempt was made to confirm these results.

Instead, with the amount of dispersing agent set at 50 milliliters, the effect of reducing the sample weight from 5 grams to 1 gram was studied. The data for this second series of experiments are reported in Table 2. The results of the experiments are in agreement with those of the first series. In short, the dispersion was better with the pumice than with the anhydrous sodium sulfate, and relatively more extractives were obtained from the 1-gram samples than from the 5-gram samples.

Table 2 - The Apparent Oil Concentration in Liver of Low-Oil-Content (Sole) as Determined from 1 or 5-Gram Samples, Using 50 Milliliters of Powdered Pumice or Powdered Anhydrous Sodium Sulfate to Disperse the Liver Material

Weight of liver sample	Kind of dispersing agent	APPARENT CONCENTRATION OF OIL IN SAMPLE											Average of replicates
		Replicate Sample Number											
		1	2	3	4	5	6	7	8	9	10		
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent		
Grams												Percent	
1	Pumice	14.8	14.0	13.4	14.6	15.0	14.7	14.7	14.1	13.8	14.6	14.4	
5	"	13.7	14.2	13.8	14.0	13.8	14.2	13.7	14.1	13.9	14.2	14.0	
1	Sulfate	11.2	13.3	12.4	12.4	12.7	12.6	11.1	13.7	13.6	13.0	12.6	
5	"	10.9	11.5	10.8	11.8	11.7	11.5	10.6	10.3	9.5	11.2	11.0	

In the present experiments, neither the amount of the non-oil impurities nor the completeness of the oil extraction was determined. For this reason, the oil concentrations reported in Tables 1 and 2 have been designated as "apparent."

The large deviations among the replicates show that the results were affected by variables other than those being directly investigated. Observations indicated that one cause of the uncontrolled variation was the clumping of the liver material after it had been introduced into the shaking bottle. The clumps were especially noticeable when anhydrous sodium sulfate was used. Clumping would account for at least a part of the variation because the aggregation of the liver particles obviously would reduce the completeness of the extraction. Therefore, in extracting oil from liver material by means of petroleum ether and the shaking method, care should be taken to obtain small, dispersed liver particles.

#### SUMMARY

Low-oil liver samples, 1, 5, or 18 grams in weight, were shaken in square, 180-milliliter bottles with 50 milliliters of petroleum ether and, depending upon the experiment, 25, 50, or 100 milliliters of powdered pumice or powdered anhydrous sodium sulfate. It was found that:

- (1) Relatively more oil was extracted from the small samples than from the large ones.
- (2) Judging both from the appearance of the liver particles when dispersed by powdered pumice or by anhydrous sodium sulfate and from the relative amounts of oil extracted when each of these materials was used under similar conditions, pumice was a more effective dispersing agent than anhydrous sodium sulfate.

- (3) With the 5-gram liver samples, 50 milliliters of dispersing agent was more effective than 25 or 100 milliliters.
- (4) For efficient oil extraction, care must be taken to obtain small, well dispersed liver particles.

#### ACKNOWLEDGEMENT

The authors gratefully acknowledge the assistance of Mr. Alvaro Bonilla A. and Mrs. Mabel A. Edwards.

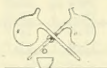
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#### PACKAGING FROZEN FISHERY PRODUCTS

Packaging is of importance in retarding oxidative changes in fish. Oxidation of the fat that is present in fish is a factor which has much to do with the period of time that fish--particularly those designated as fatty--can be maintained in a satisfactory condition in frozen storage. The fat contained in fish is much more susceptible to oxidation than is the fat found in other animal or vegetable foods. Oxygen is rapidly absorbed by this fat and will soon cause the loss of fresh flavor and the development of rancidity. Bleaching and fading of the natural color of the fish may also occur and in extreme cases the fat will darken, causing the fish to assume a brown color. These changes can be retarded by packaging tightly with essentially air-tight wrappings to prevent ready passage of air to the fish.

--Fishery Leaflet 324





April 1950

REFRIGERATION: Volatile acid numbers (V.A.N.) were determined for the striped bass that were pan-dressed, packaged in different ways, and held in zero storage for 12 months. The fish that were wrapped (unfrozen) in vegetable parchment, followed by dipping in water, wrapping in cellophane, and freezing, had a V.A.N. of 10.6. Those that were frozen first, then glazed, followed by wrapping in cellophane, had a V.A.N. of 12.8. Unfrozen fish that were wrapped in cellophane and then frozen (no glaze), had a V.A.N. of 39.5. (Volatile acid numbers increase as quality decreases). These determinations bear out the findings of visual examinations in that the water-soaked parchment maintained a higher quality in the fish than did the other treatments.

\* \* \*

The first month's examination of frozen oysters treated with ascorbic acid and glazes revealed an acceptable score for all samples. Differences between lots were small.

\* \* \*

SANITATION AND QUALITY CONTROL: A study is being made on the cultural characteristics of "pink yeast" isolated from oysters.

\* \* \*

The survey project of the southern states to determine the effect of industrial waste pollution on the marine fisheries was completed.

\* \* \*

PRESERVATION: Several additional chemicals were tried as preservatives for salmon eggs. Sodium metaphosphate and sodium phosphate were tried without success. Formaldehyde gave adequate preservation but badly distorted the texture of the eggs. Sodium borate in preliminary trials gave very promising results. A combination of sodium sulfate and sodium benzoate gave better preservation than either chemical alone. Several additional phenolic compounds are under test at the present time.

\* \* \*

Samples of canned pink salmon prepared from frozen fish were examined. Members of the National Cannery Association Laboratory cooperated with the Service in examining the packs. There was a small decrease in free oil in pink salmon canned from frozen fish than was the case in a previous lot of sockeye salmon

examined earlier. Development of curd in canned frozen salmon was more noticeable on the sockeye than the pink salmon. This is because the curd is white in color and contrasts very sharply to the bright red color of sockeye, whereas it seems to blend in with the natural color of the pink salmon and is therefore not so noticeable. The pink salmon canned from frozen fish had developed strong rancid flavors and the fatty layer was more discolored than was the case with sockeye canned from frozen fish.

\* \* \*

NUTRITION AND COMPOSITION: Samples of frozen fish obtained during exploratory operations in the Bering Sea were analyzed for proximate composition. The results are as follows:

Species	Percent ash	Percent moisture	Percent oil	Percent protein
Yellowfin sole	1.46	82.7	1.3	17.0
Rock sole	1.30	80.7	1.3	19.2
English sole	1.29	80.7	1.8	18.5
Lemon sole	1.23	84.1	1.0	18.1
Pollock	1.37	81.6	1.0	19.3
Flathead sole	1.15	80.9	1.2	19.7
King crab	2.15	79.3	1.4	18.9

\* \* \*

BYPRODUCTS: Work was continued during the month on the project concerned with the loss of vitamin B<sub>12</sub> and animal protein factor during processing of fish meal. Four samples of herring fish meal were obtained from different sources. Also, three samples of raw frozen herring were obtained, likewise from different sources. The raw herring was ground, stirred until uniform, hermetically sealed in  $\frac{1}{2}$ -pound flat cans, and stored at 0° F. The herring meal was also stored in hermetically sealed tin cans. Work is now proceeding on analyses of the vitamin B<sub>12</sub> content of the fish meal and fresh herring samples. The purpose of these tests is to determine whether the vitamin B<sub>12</sub> content of the fish meal, after correcting for losses occurring during manufacture (that is, moisture loss, etc.), is less than the vitamin B<sub>12</sub> content of the original raw material. If no significant losses occur during processing, no further extensive work will be required. However, if it develops that there is a significant loss of vitamin B<sub>12</sub> during preparation of fish meal, further tests will be made to determine whether this occurs during cooking, drying, or other stages of the manufacturing process.

\* \* \*

A number of hatchery food materials were analyzed for vitamin B<sub>12</sub> with the following results:



Material Analyzed	Vitamin B <sub>12</sub> Content (micrograms per gram)
1. Columbia river viscera - vacuum-freeze dried	0.5
2. Columbia river viscera - steam-vacuum dried	0.7
3. Columbia river viscera - tunnel dried	0.7
4. Columbia river viscera - 145°, prepared 1948, stored at Leavenworth	0.64
5. Salmon offal meal - commercial	0.2
6. Stickwater - lyophilized	2.5
7. Crab meal - East Coast (commercial)	0.16
8. Crab meal - Pacific Coast (commercial)	0.012
9. Herring stickwater concentrate	0.2
10. Crab meal (prepared here, not used at Leavenworth)	0.06
11. Herring solubles (dried)	0.4
12. Halibut sawdust	0.01

Aside from the principal value of these analyses in connection with the hatchery feed program, the data give some indication as to the possible distribution of vitamin B<sub>12</sub> in fish meals. Samples 1 through 4 and 6 were all prepared from the same raw material at the Seattle laboratory. It would appear that exposure of the raw material to temperatures up to that of free steam do not destroy vitamin B<sub>12</sub>, but that a large quantity of this vitamin appears in the stickwater. Sample 9 (herring stickwater concentrate), which had a relatively low vitamin B<sub>12</sub> content, was one poorly processed as evidenced by the low content of other vitamins and very poor nutritive value in fish-feeding tests. From the almost zero content of vitamin B<sub>12</sub> in the halibut sawdust (collected during cutting of frozen halibut steaks), it is probable that vitamin B<sub>12</sub> does not occur in appreciable quantities in the meat of fish.

\* \* \*

## TECHNICAL NOTE NO 4-FISHERY BYPRODUCTS FOR ANIMAL FEEDING

Condensed fish solubles and fish meals contain several of the newly discovered growth-promoting vitamins, according to reports by research men attending the scientific meetings in Philadelphia and Atlantic City this year. These products are among the few natural feedstuffs which probably contain growth-promoting factors similar in action to the antibiotic aureomycin. They also contain at least one other newly-discovered growth-promoting factor only otherwise found in dried yeast or liver.

Condensed fish solubles are usually included in the concentrate feeds for poultry and swine at a level of two percent, and fish meals at a level of 4 to 6 percent of the ration. Not only do these fishery byproducts supply certain other necessary vitamins, including vitamin B<sub>12</sub>, but they are good sources of high quality protein, and certain nutritionally essential minerals, particularly calcium, phosphorus, iron, and copper. The high protein content (from 55 to 70 percent protein) and low fiber content of fish meal makes it a particularly efficient source of protein, minerals, and vitamins in high-energy rations for

quickly growing poultry and swine. Condensed fish solubles may also be used, particularly because of their high values for vitamins and minerals.

Condensed fish solubles or fish meals may also be included to good advantage in breeder rations for these farm animals since they efficiently balance the nutrients of the low-cost cereals or cereal byproducts which make up the bulk of the rations. They also act as a safety factor in the rations to protect the animals against the occasional serious deficiencies of specific nutrients of other feed ingredients used in the rations fed, which may be caused by adverse storage conditions or poor processing; and against factors of undue stress in the animals themselves, produced by unfavorable surroundings, adverse weather, or potential infections.

--Dr. Hugo Nilson, Pharmacologist,  
Fishery Technological Laboratory,  
College Park, Maryland.



### BAKED HALIBUT STEAKS

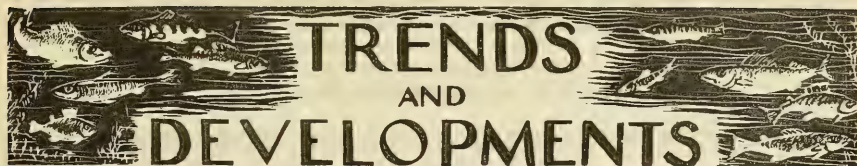


2 pounds halibut steaks.  
1 teaspoon salt.  
1/8 teaspoon pepper.  
2 tablespoons lemon juice.

1 teaspoon onion, grated.  
4 tablespoons butter or other  
fat, melted.  
paprika.

Cut fish into serving size portions. Sprinkle both sides with salt and pepper. Add the lemon juice and onion to the melted fat. Dip each piece of fish into this mixture and place in a greased baking pan. Pour the rest of the fat over the fish. Bake in a moderate oven 350° F. for 25 to 30 minutes or until fish flakes easily when tested with a fork. Sprinkle with paprika. Serve immediately on a hot platter. Serves 6.





# TRENDS AND DEVELOPMENTS

## Additions to the Fleet of U. S. Fishing Vessels

During March 1950, a total of 58 vessels of 5 net tons and over received their first documents as fishing craft--9 less than in March 1949. California led with 11 vessels followed by Louisiana and Florida with 8 vessels each, reports the Bureau of the Customs of the Treasury Department.

During the first three months of 1950, a total of 142 vessels were documented, compared with 175 during the same period in 1949.

Vessels Obtaining Their First Documents as Fishing Craft, March 1950					
Section	March		Three months ending with March		Total 1949
	1950	1949	1950	1949	
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
New England	2	-	7	2	35
Middle Atlantic	3	7	5	14	44
Chesapeake Bay	4	3	14	15	87
South Atlantic & Gulf	29	32	63	85	369
Pacific Coast	15	11	39	30	327
Great Lakes	1	7	3	15	38
Alaska	4	6	11	12	96
Hawaii	-	1	-	2	5
Unknown	-	-	-	-	1
<b>Total</b>	<b>58</b>	<b>67</b>	<b>142</b>	<b>175</b>	<b>1,002</b>
NOTE: Vessels have been assigned to the various sections on the basis of their home port.					



## ECA Procurement Authorizations for Fishery Products

Included among the procurement and reimbursement authorizations announced by the Economic Cooperation Administration during May this year was \$219,000 for the purchase of edible and inedible fishery products from the United States and Possessions. Of this amount, \$210,000 was to be used by the Federal Republic of Germany for the purchase of inedible fish oil, and \$9,000 by Trieste for the purchase of canned fish (except shrimp, crab meat, and lobster meat).

Certain decreases in previous authorizations have taken place which reduce the total amount authorized for fishery products under the ECA program from

April 1, 1948, through May 31, 1950. All of the decreases (a total of \$397,000) involved authorizations for purchases from the United States and Possessions. The decreases consisted of \$125,000 for Belgium-Luxembourg for the purchase of canned fish; \$57,000 for Ireland for the purchase of canned fish; and \$215,000 for the German Federal Republic for the purchase of fish oil.

Table I - Total ECA Procurement Authorization for Fishery Products, April 1, 1948 - May 31, 1950

Commodity	Country of Origin	Recipient Country	Amount Authorized U.S. \$
<u>FISH (Edible):</u>			
Fish, Canned	U. S. & Possessions	Belgium-Luxembourg	813,000
		Greece	304,000
		Ireland	722,000
		Italy	847,000
		Trieste	9,000
		United Kingdom	4,127,000
	Canada (including Newfoundland)	United Kingdom	6,636,000
Total Canned Fish .....			13,458,000
Fish, Salted	Canada (including Newfoundland)	French West Indies	150,000
		Greece	1,250,000
		Italy	2,688,000
Total Salted Fish .....			4,088,000
Total Edible Fish .....			17,546,000
<u>BYPRODUCTS:</u>			
Fish & Whale Oils	Norway	Austria	1,216,000
	U. S. & Possessions	France	23,000
	Newfoundland	France	257,000
	U. S. & Possessions	Germany	1,422,000
	Iceland	"	1,693,000
	Norway	"	2,960,000
	Belgium	"	2,201,000
	U. S. & Possessions	Netherlands	678,000
Total Fish & Whale Oils .....			10,450,000
Fish Meal	Iceland	Austria	183,000
	Canada (including Newfoundland)	Denmark	394,000
	Norway & Portugal	Germany	963,000
Total Fish Meal .....			1,540,000
Total Byproducts .....			11,990,000
Grand Total (Edible Fish and Byproducts) .....			29,536,000

Total authorizations for fishery products and byproducts from April 1, 1948, through May 31, 1950, amounted to \$29,536,000 (see Table 1). This amount consisted of \$13,458,000 for canned fish; \$4,088,000 for salted fish; \$10,450,000 for fish and whale oils; and \$1,540,000 for fish meal (see Table 2).

In addition, there were some authorizations for some related fisheries products during May. The Federal Republic of Germany received an authorization for \$30,000 for the purchase of pearl essence from the United States and Possessions, and Austria \$40,000 for the same purpose. The Netherlands received an authorization for \$5,000 for the purchase of fish glue from the United States and Possessions.



An authorization to Korea for building fishing vessels was announced during the month. The sum of \$1,424,000 was approved for the purchase of commodities for the

Table 2 - ECA Procurement Authorizations for Fishery Products by Country of Origin and Commodity,  
April 1, 1948 - May 31, 1950

Country of Origin	Canned Fish	Salted Fish	Total Edible Fish	(In U.S. Dollars)	Fish and Whale Oils	Fish Meal	Total By-products	Grand Total Fish & Byproducts
United States.....	6,822,000	-	6,822,000		2,123,000	-	2,123,000	8,945,000
Canada (Including Newfoundland) ..	6,636,000	4,088,000	10,724,000		257,000	394,000	651,000	11,375,000
Iceland.....	-	-	-		1,693,000	183,000	1,876,000	1,876,000
Belgium.....	-	-	-		2,201,000	-	2,201,000	2,201,000
Norway.....	-	-	-		4,176,000	-	4,176,000	4,176,000
Norway and Portugal.....	-	-	-		-	963,000	963,000	963,000
Total.....	13,458,000	4,088,000	17,546,000		10,450,000	1,540,000	11,990,000	29,536,000

ECA project to construct fishing vessels for rehabilitation of Korean fisheries. The commodities under this project are to be procured by the United States Federal Supply Service from Japan, United States and Possessions, British Dependencies in Asia and Oceania, and the Philippines. Of the total authorized, \$603,000 is to be spent for vessels and equipment, \$323,000 for engines, and the balance for miscellaneous equipment and materials for the project.

France received a procurement authorization of \$70,000 to cover the purchase of spare parts for vessels and barges from Canada. Of this amount, approximately \$50,000 will probably be used for the purchase of spare parts for fishing vessels.

Since ECA is placing increasing stress on capital equipment, there is a correspondingly decreasing emphasis on food products. This does not apply to surplus food products.

Under a new Marshall Plan project to give Koreans a chance to catch up on modern technical "know-how", 23 Americans will go to Korea, ECA reported on May 1. The U. S. instructors and administrators will be selected by the Illinois Institute of Technology to direct a study program at the new Korean Technical Institute at Seoul which is scheduled to open on July 1. A small phase of this project will be conducted at the Pusan Fisheries Institute, a branch of the Technical Institute in Seoul, where Koreans will be taught modern fishing practices, processing of marine food products (such as, canning, salting, smoking, drying, and freezing), principles of handling and sanitation, and plant management. The Americans will be sent to Korea under ECA's technical assistance program and will spend one year at the Institute bringing Korean teachers and student trainees up to date on technical skills. Dollar costs of \$475,000 for the entire project (fisheries is only a small part of this project) will be paid by ECA.

A list of new Italian import-license preliminary approvals issued by the Office of Small Business during May included an import license for 50 outboard motors for fishing boats with an approximate value of \$16,000. This list covers the purchase of equipment from the United States under ECA financing.

Establishment of a Special Technical and Economic Mission (STEM) to the associated states of Indo-China (Vietnam, Laos, and Cambodia) was announced on May 25 by ECA. Other ECA missions to strategic areas in southeast Asia are in prospect.

In its seventh quarterly report to Congress (for the last quarter of 1949), ECA pointed out that a record high industrial production rate, substantially increased exports, and removal of many quota restrictions featured economic recovery progress

in Western Europe during the fourth quarter of 1949. Devaluation of currencies, the report noted, did not set off a new cycle of inflation as had been feared.

The improved competitive position of Western European goods in world markets, resulting from the devaluation of currencies in September, was followed by a substantially increased volume of exports. The report also described the proposed European Payments Union and told how it would promote full transferability of European currencies and assist in creating suitable monetary conditions for the expansion of European trade.



THIS POSTER, SUBMITTED BY REIJN DIRKSEN, A DUTCH ARTIST, WAS AWARDED FIRST PRIZE AND \$1,500 IN AN INTRA-EUROPEAN MARSHALL PLAN POSTER CONTEST SPONSORED BY ECA.

The Economic Cooperation Administration has announced the availability of publications designed to assist American business firms which desire to trade with Italy and Greece. The publications, prepared at the request of ECA's Office of Small Business, include directories of Italian and Greek importers. They also contain summaries of economic information on the two countries together with general data and trade regulations and resumes of export and import procedures. Both manuals<sup>1</sup> also contain lists of products available for export.

To aid American businessmen interested in doing business with Greece, the Foreign Trade Administration of the Ministry of National Economy of Greece also

has opened an office in Washington, D. C.

- 1/ Greece--A Businessman's Manual and Directory on Trading with Greece, see listing on page 79 of this issue. Italian Importers of U. S. Commodities, see listing on page 97 of the April 1950 issue of Commercial Fisheries Review.



## Federal Purchases of Fishery Products

DEPARTMENT OF THE ARMY, March 1950: A total of 825,341 pounds (valued at \$420,349) of fresh and frozen fishery products were purchased during March this year by the Army Quartermaster Corps for the U. S. Army, Navy, Marine Corps, and

Purchases of Fresh and Frozen Fishery Products by Department of the Army (March and the First Three Months, 1949 and 1950)							
Q U A N T I T Y				V A L U E			
March		January-March		March		January-March	
1950	1949	1950	1949	1950	1949	1950	1949
lbs.	lbs.	lbs.	lbs.	\$	\$	\$	\$
825,341	1,588,166	2,568,844	3,954,229	420,349	510,200	1,187,460	1,332,972



Air Force for military feeding. Purchases for March were 44 percent more in quantity and 57 percent higher in value than for February 1950. However, purchases for March 1950 were 48 percent lower in quantity and 18 percent lower in value, compared with March a year ago.

For the first three months in 1950, the quantity of fresh and frozen fishery products purchased was 35 percent lower and the value 11 percent below the corresponding period in 1949.



## Fishery Biology Notes

HAMMOND BAY CHOSEN AS FIELD HEADQUARTERS FOR SEA LAMPREY RESEARCH: The United States Coast Guard is permitting the Fish and Wildlife Service to use the Hammond Bay Boat Station on Lake Huron near Rogers City, Michigan, as field headquarters for research on methods of controlling the sea lamprey. This station not only has excellent office facilities, but can be fitted readily into an experimental laboratory. A boat slip and marine railways will permit the basing of small craft at the station.

The location of field headquarters for research on the sea lamprey on Hammond Bay is advantageous since the station is situated approximately in the center of the experimental control zone that will be established this year between Waugachance Point in Lake Michigan at the western end of the Straits of Mackinaw and Alpena, Michigan, on Lake Huron. Every spawning stream in this stretch of shoreline that does not now contain a barrier to the migration of the sea lamprey is to have a weir or other experimental device for the capture and destruction of the spawning run.

It was also in the Hammond Bay region of Lake Huron that the first scientific studies of the sea lamprey in the upper Great Lakes were initiated four years ago under the sponsorship of the Michigan Department of Conservation.

HATCHERY TO HELP RESTORE GREAT LAKES LAMPREY-DEPLETED LAKE TROUT FISHERY: Pen-dill's Creek, 25 miles west of Sault Ste. Marie, Michigan, on Lake Superior, has been chosen as the site of the Upper Peninsula lake trout hatchery, the Secretary of the Interior announced on May 3. The experimental hatchery, designed to help restore the lamprey-depleted lake trout fishery of the Great Lakes, was made possible by a Congressional bill which authorized a total of \$325,000 for the project; \$92,500 of this sum was later made available.

Construction of the hatchery will begin early this summer. The hatchery is expected to be in full operation a year from this fall.

When the number of lampreys decline, officials of the U. S. Fish and Wildlife Service hope that the Lake Michigan fishery can be built up by restocking with lake trout. The introduction of large fingerlings follows the practice of the Pacific salmon cultural stations--which has shown that stocking with larger fish is much more effective than with fry.



## Fish Marketing Study Inaugurated in Latin America<sup>V</sup>

In order to investigate and obtain information on current and potential markets in Latin America for United States fishery products, particularly canned fish, the U. S. Department of Agriculture has initiated a study under its Research and Marketing Act program. The project is sponsored by that agency's Office of Foreign Agricultural Relations in cooperation with the Fish and Wildlife Service, U. S. Department of the Interior.

Two specialists, already stationed in Latin America, have been assigned by the Fish and Wildlife Service to carry out the first-hand study. They are Milton J. Lindner, chief of the U. S. Fishery Mission to Mexico with headquarters at the American Embassy in Mexico City; and Robert O. Smith, who has been stationed since 1949 at the American Embassy at Lima as chief of the Fishery Mission to Peru.

The two specialists met the week of May 21 at Caracas, Venezuela, to confer and to complete final plans for the survey. Lindner will travel down the east coast of South America, and Smith will survey the West Coast. They will return to their posts in late June.

This survey is patterned after a similar survey of European markets for fishery products made in 1948. The two specialists will visit Venezuela, Argentina, Uruguay, Paraguay, Brazil, Surinam, Curacao, Colombia, Ecuador, Bolivia, Peru, and Chile.

<sup>1</sup>/See page 33 of this issue for a report on the Argentine Republic--the first of this series.



## Gulf Exploratory Fishery Program

"OREGON" RETURNS FROM FIRST CRUISE: Observations on tuna, snappers, bait fish, and shrimp were made by the Oregon on its first cruise in the Gulf of Mexico between

May 8-25. This vessel of the Service's Gulf Exploratory Fishery Program left Pascagoula, Mississippi and proceeded west of the Mississippi River to shallow water off the Louisiana coast. About three days were spent in attempts to get a good supply of live bait for tuna. The vessel worked westward along the continental shelf and put in at Galveston May 17.

The cruise was continued on May 23 off the Texas and Louisiana coasts along the 50-fathom curve, and the Oregon returned to Pascagoula on May 29.



THE OREGON OF THE SERVICE'S GULF EXPLORATORY FISHERY PROGRAM LEAVING FOR ITS FIRST CRUISE.

number of small schools of the little tuna (Euthynnus alletteratus) were encountered over depths greater than 30-fathoms, frequently among scattered schools of the common jack (Cerax nippos). Attempts to attract the little tuna with live bait were unsuccessful and trolling with artificial bait met with limited success. The little tuna captured were gorged with percomorph fish about  $1\frac{1}{2}$  inches long. Dolphin, barracuda,

Observations on Tuna: On the Louisiana and Texas coasts a large



and one wahoo, as well as common jacks, were taken while trolling with artificial bait for little tuna. A school of larger fish, possibly tuna, was sighted but could not be approached to permit identification or accurate estimate of the size of the fish.

The bait fish located were in water too shallow to permit the use of the typical lampara bait seine. Collection of a small quantity of bait was made with a shrimp trawl. The bait remained alive in the tanks until the return to Pascagoula but many of the fish obtained were not suitable for bait.

Observations on Snappers: Surface and bottom temperatures were recorded on snapper banks. Snapper stomachs were collected for examination. One shrimp trawl drag contained six snappers under 10 inches long. Snappers weighing 16 to 29 pounds were taken in other drags at night on mud bottom.

Shrimp: Six 30-minute drags with a 40-foot shrimp trawl, in fifty fathoms on mud bottom, were made at widely separated points off the Louisiana and Texas coasts. All of these drags produced grooved shrimp (*Peneus aztecus*), 8 to 15 count per pound (heads on), and no other commercial species of shrimp. Quantities obtained were small, one to nineteen pounds, and three trawls were lost when bogged in heavy mud. It is expected that difficulties encountered in dragging can be overcome with modifications of the trawling rigs.

Miscellaneous Observations: Scrap fish obtained at fifty fathoms included several species hitherto known chiefly in the West Indian and Caribbean region. Bottom temperatures at fifty fathoms were only 1° F. to 9° F. colder than surface temperatures.

"OREGON" SEARCHES FOR SURFACE-FEEDING TUNA IN THE GULF: Searching for surface-feeding tuna and other mackerel-like fish, and continuation of exploratory fishing for snappers are the main objectives of the Oregon's second cruise. This vessel of the Service's Gulf Exploratory Fishery Program left Pascagoula, Mississippi, on June 8, 1950, and is scheduled to return to port about June 30. Operations will be conducted in the Gulf of Mexico east of the Mississippi River, particularly near the 100-fathom curve between the Mississippi coast and Key West.

Collections of material and data similar to that collected on the first cruise in the west Gulf of Mexico will be made for comparison purposes. Shrimp trawl dragging in 50 to 100 fathoms also will be continued.



## Menhaden Fishery Movie in Production

The menhaden fishery (the largest fishery in the United States) is the subject of a U. S. Fish and Wildlife Service film now in production.

The new 16 mm. sound and color film is a cooperative project of the menhaden industry and the Fish and Wildlife Service's Branch of Commercial Fisheries. The menhaden industry is financing the film, and the Branch of Commercial Fisheries is directing its production and will be responsible for distribution of prints.

The picture will tell the story of menhaden--from the catching of these tremendous schools of small herring-like fish to the processing and utilization of

the fish meal and oil products in agriculture and industry. It is estimated that the film will be completed within one year.



## North Atlantic Fishery Investigations

"ALBATROSS III" CHECKS MOVEMENTS OF PRINCIPAL WINTER-TRAWL FISHERY SPECIES  
(Cruise 35): Checking the inshore movements of the principal species supporting the offshore winter-trawl fishery and pertinent temperature observations were the principal objectives of an eight-day cruise by the Albatross III, research vessel of the Service's North Atlantic Fishery Investigations. Made in cooperation with the Woods Hole Oceanographic Institution, the cruise was completed on May 19 when the vessel returned to Woods Hole, Mass.



ABOARD THE ALBATROSS III--BIGELOW WATER SAMPLER  
READY TO BE LOWERED.

Additional objectives were underwater bottom photography and further brine-freezing of haddock in the round for the Technology Section of the Branch of Commercial Fisheries.

With the standard  $1\frac{1}{2}$  Iceland trawl (liners in bellies and cod end, no rollers or V-D gear) 63 half-hour tows were made beginning at a point ten miles southwest of Cox Ledge, extending to the edge of the Hudson Canyon in 210 fathoms, eastward to southeast Georges in depths ranging from 50 to 240 fathoms, westward in shoaler water (30 to 50 fathoms) to the Nantucket Shoals region, then northwest to the final station ten miles west of No Mans Land.

Temperatures were obtained by bathythermograph lowerings and on several of the deeper stations by reversing thermometers.

Although 51 species were taken during the cruise, only scup were caught in commercial quantities (between Cox's Ledge and Hudson Canyon).

Further data on the life history of the shad were added when a number of small ones were caught. These were of a size (10 to 14 inches) never seen in the rivers where they run on their spawning migration.



A catch of very large redfish was taken on the continental slope in 175-195 fathoms, off the south central part of Georges Bank. In this same haul two baby halibut about 6 inches long also were taken. The catch of fluke was relatively small and most of the fish were taken between 40 and 60 fathoms, indicating that a large percentage of the fish inhabiting the wintering grounds (50 to 70 fathoms) had not yet migrated far toward shoaler water.



## North Pacific Exploratory Fishery Program

"JOHN N. COBB" LEAVES ON FOUR-MONTH CRUISE: The Service's North Pacific Exploratory Fishery Program vessel, John N. Cobb, left Seattle on June 12, 1950, on a four-month exploratory fishing cruise in the offshore waters of the North Pacific. Primary objectives of this cruise are to locate commercial concentrations of albacore tuna; determine their pattern of abundance; trace their general migration in the waters off Oregon, Washington, and Southeastern Alaska; and determine the most effective means of capturing the tuna commercially.

The vessel will fish with usual commercial gear, such as, surface-trolled jigs and live bait. In addition, in an attempt to determine the vertical distribution of these fish, both linen and nylon gill nets will be used by the vessel. When conditions permit, long-lining and deep trolling for tuna will be tested. Oceanographic and other scientific information related to the problem will be collected.

A daily broadcast of findings will be made from the vessel to the fishing fleet in the North Pacific.



## Pacific Halibut Areas 1B and 2 Closed on June 1

The International Fisheries Commission announced on May 20, 1950, that Areas 1B and 2 (with a quota of 25,500,000 pounds) in the Pacific were closed at midnight June 1, 1950, to all halibut fishing except that provided for in Article 1 of the Convention. By that date the Commission estimated that the quota for Area 2 (located between Willapa Harbor, Washington, and Cape Spencer, Alaska) will have been filled. There is no quota for Area 1B (located between Cape Blanco, Oregon, and Willapa Harbor, Washington), but this area is closed with Area 2.

These two areas in 1949 were closed at midnight June 3. The 1950 season for these areas was 32 days long, compared with 34 days in 1949, 32 days in 1948, 39 days in 1947, and 42 days in 1946.

No closing dates have been announced as yet for other areas. The 1949 catch limits for Areas 3 and 4 are 28,000,000 and 500,000 pounds, respectively, the same as in 1949.



## Pacific Oceanic Fishery Investigations

"HENRY O'MALLEY" SAILS ON LOCAL FISHING CRUISE (Cruise No. 3): In order to determine the abundance of live bait at this time of the year, the research and exploratory fishing vessel Henry O'Malley left Pearl Harbor on May 16 on Cruise No. 3 for one month. This vessel of the Service's Pacific Oceanic Fishery Investigations will operate on French Frigate Shoals and will attempt to take a full load of live bait.

Using this bait and bait from other areas, the Henry O'Malley will engage in aku (skipjack) fishing in waters in the vicinity of the Hawaiian and Leeward Islands. The purpose is to develop techniques of employing mainland-style vessels and gear under conditions to be met with in the mid-Pacific, and to determine the catching rate of such gear for evaluation of subsequent exploratory fishing results in new and unexplored areas.

"HUGH M. SMITH" LOCATES FISH EGGS AND LARVAE AND INVESTIGATES TAGGING OF TUNA (Cruise No. 4): In order to determine the presence of tuna eggs and young, the Hugh M. Smith of the Service's Pacific Oceanic Fishery Investigations fleet sampled the waters lying within 400 miles of the Hawaiian Islands with fine-meshed nets. Although the material collected on the cruise has not been examined as yet, preliminary inspection revealed the presence of a large number of fish eggs and larvae, among them small sailfish between  $\frac{1}{4}$  and  $\frac{1}{2}$  inch in length, indicating a recent spawning of this species.

This was the vessel's fourth cruise--left Pearl Harbor on May 10 and returned 22 days later on June 2.

As a secondary mission of the cruise, methods of tagging tunas were investigated. Twenty skipjack (aku) and small yellowfin (ahi) were tagged and three skipjack were held in the live well aboard the vessel for the last two days of the cruise. Of the total tagged, 13 were tagged with hooks placed in the jaw, and 7 by inserting a flat tag into the body cavity.

Approximately 750 pounds of small bait fish were caught during the baiting operations on this cruise--nehu (a small anchovy), iao (a small silverside smelt), and mosquito fish (Mollienesia sp.). The bait was used to fish six schools of fish. The catch consisted of 162 skipjack tuna and 85 dolphin.



## South Pacific Fishery Investigations

"BLACK DOUGLAS" CONTINUES SARDINE RESEARCH: The Service's South Pacific Fishery Investigations has revised the station pattern for the research vessel, Black Douglas, in order to provide more intensive coverage of spawning areas and still retain extensive coverage. Sardine spawning during February and March was reported confined to an area off Lower California.

The 1947 and 1946 year-classes comprised 80 percent of the 1949-50 catch in numbers of fish. These same year-classes contributed 87 percent in 1948-49. The incoming 1948 class appears subnormal for one-ring fish. The 1945, 1944, and 1943 classes, which hitherto have been either weak or underrepresented, appeared over-available.

From April 3 to April 17, the Investigations' Black Douglas made a cruise at stations located between Cape Mendocino and Monterey Bay, Calif. This was one of the regular monthly cruises of the cooperative sardine research program, which is attempting to determine the amount and extent of sardine spawning, productivity of the area, the current pattern of the region, and other related characteristics of the marine climate off the west coast of North America.

Volumes of plankton collected on this cruise were large as on the two previous cruises in this area. However, no adult sardines were sighted during the cruise. The numbers of sauries observed were less than on previous cruises. Fur seals were observed over the entire extent of the cruise, although they were fewer in number than those observed during February and March this year.



### Splitting of Fish Fillets Being Adopted

As a result of the work carried out by the Service's Technological Laboratory in Seattle<sup>1</sup> on the splitting of rockfish fillets, several commercial fishery firms have now adopted this procedure for special use, such as, the fish and chips trade.

Modern fish-skinning machines can be adapted for splitting fish fillets at any desired thickness. This has several advantages, such as, (1) the production of more desirable thin sections from thick fillets, (2) the preparation of fillets of uniform thickness, (3) the preparation of extremely thin sections of fillets for use in special recipes.

The removal of most of the dark flesh beneath the skin of the rockfish fillets by use of the skinning machine set to remove approximately 1/8 inch of the flesh as well as the skin was recommended by the Service. This practice about doubles the cold-storage life of the frozen rockfish fillet. In view of this, certain fish companies now specify in their orders that all rockfish fillets have the dark flesh and skin removed by a fish-skinning and splitting machine.

<sup>1</sup>/ See "Storage Life of Whole and Split Rockfish Fillets" by M. E. Stansby and J. Dassow, Commercial Fisheries Review, July 1949, Vol. 11, No. 7, pp. 1-8 or Separate No. 233.



### Pack of Maine Sardines (Including Sea Herring), 1949

The 1949 pack of Maine sardines (including sea herring) amounted to 3,074,523 standard cases, valued at \$21,051,675 to the packers. This was a decline of 17

Table 1 - Pack of Maine Sardines by Style of Pack, and by Size of Can and Case, 1949  
(Quantity in Standard and Actual Cases, and Value to the Cannery)

Style of Pack	Total		Avg. Price	Size of Can and Case	Total		Avg. Price
	Quantity	Value			Quantity	Value	
	Std. Cases <sup>1</sup>	\$	Per Std. Case		Actual Cases	\$	
Natural .....	48,738	105,000	2.15	3½ ounces net (100 cans) ..	2,941,454	20,624,895	7.01
In soybean or other vegetable oil ..	2,760,926	19,199,855	6.95	10 " " (48 " ) ..	20,164	139,211	6.90
In mustard sauce .....	174,777	1,237,962	7.09	15 " " (48 " ) ..	40,628	223,933	5.51
In tomato sauce .....	22,346	175,225	3.35	Other sizes converted to			
In olive oil .....	22,072	209,423	9.49	3½ ounces net			
Other <sup>2</sup> .....	15,554	124,210	7.92	(100 cans) .....	13,221	53,654	4.79
Total .....	3,074,523	21,051,675	6.85	Total .....	3,015,327	21,051,675	-

<sup>1</sup>/Standard cases<sup>2</sup> represent cases of various sizes converted to 100 4-oz cans (3½ ounces net) to the case.

<sup>2</sup>/Includes special packs of sardines (including sea herring; smoked and kippered; smoked in soybean oil; smoked in olive oil; and fillets in soybean oil).



percent in quantity and 23 percent in value as compared with the previous year. The average price per standard case declined from \$7.97 in 1948 to \$6.85 in 1949.

Sardines (including sea herring) were canned in 47 plants in Maine, 3 in Massachusetts, and 1 in New Hampshire.

Table 2 - Pack of Maine Sardines (Including Sea Herring) 1941-49  
(Quantity in Standard Cases<sup>1</sup> and Value to the Cannery)

Year	Quantity	Total Value	Avg. Price Per Std. Case	Year	Quantity	Total Value	Avg. Price Per Std. Case
	Std. Cases <sup>1</sup>	\$	\$		Std. Cases <sup>1</sup>	\$	\$
1949	3,074,523	21,051,675	6.85	1944	3,261,984	14,819,803	4.54
1948	3,682,392	29,359,114	7.97	1943	2,505,114	11,104,570	4.43
1947	3,013,910	28,310,674	9.39	1942	2,873,246	12,162,451	4.23
1946	3,276,338	20,275,590	6.19	1941	3,164,787	12,590,958	3.98
1945	2,725,216	12,077,201	4.43	1940	1,117,748	3,736,394	3.34

<sup>1</sup>Cases of various sizes converted to 100  $\frac{1}{4}$ -oil cans (3 $\frac{1}{4}$  ounces net) to the case (standard case).

Note: The pack of herring previously reported as canned sea herring has been converted to the equivalent of 100  $\frac{1}{4}$ -oil cans (3 $\frac{1}{4}$  ounces net) to the case and included with the pack of sardines.

Prior to 1949, the packs of fish canned as sardines and as sea herring were tabulated separately. However, in 1949 the tabulation of the packs was combined. The comparative data in Table 2 likewise represents the combined packs for the past ten years.



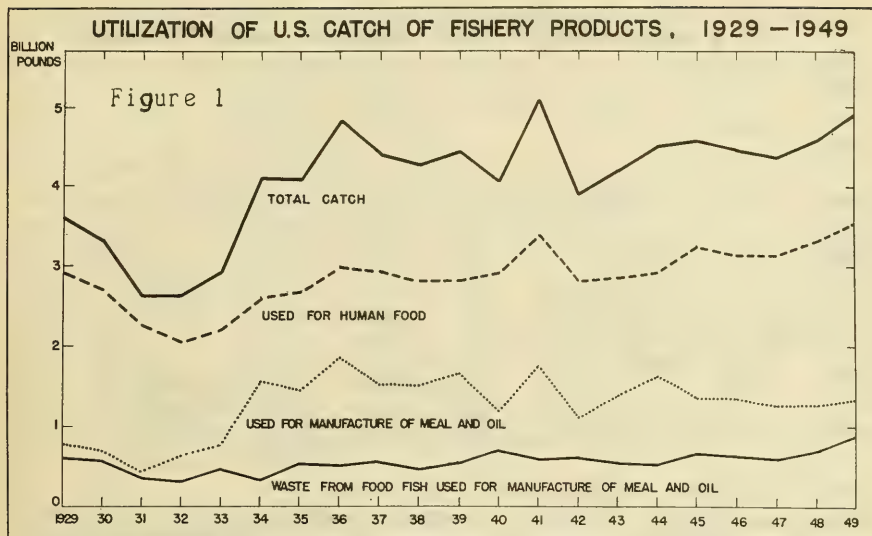
## Manufacture of Meal and Oil Utilizes Half of the Fisheries Catch

About 46 percent of all fishery products landed in the United States and Alaska during 1949 was utilized in the manufacture of fish meal and oil (Figure 1). Because fish meal and oil are used where they are not recognized as fishery by-products, the importance of the fisheries that supply this industry is little known by the public.

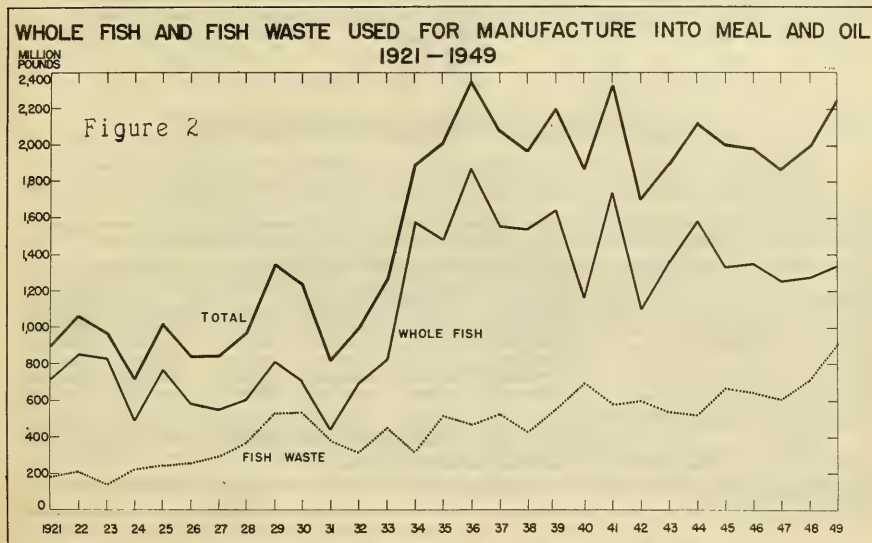
On the farm, fish meal is an important ingredient of poultry and hog feeds. In industry, fish oil is utilized in soap, paint, varnish, insect spray, machinery lubricants, printing ink, oil cloth and linoleum, and in industrial processes (like leather tanning and aluminum casting). Thus, meal and oil from fish are converted into products which are used daily by everyone.

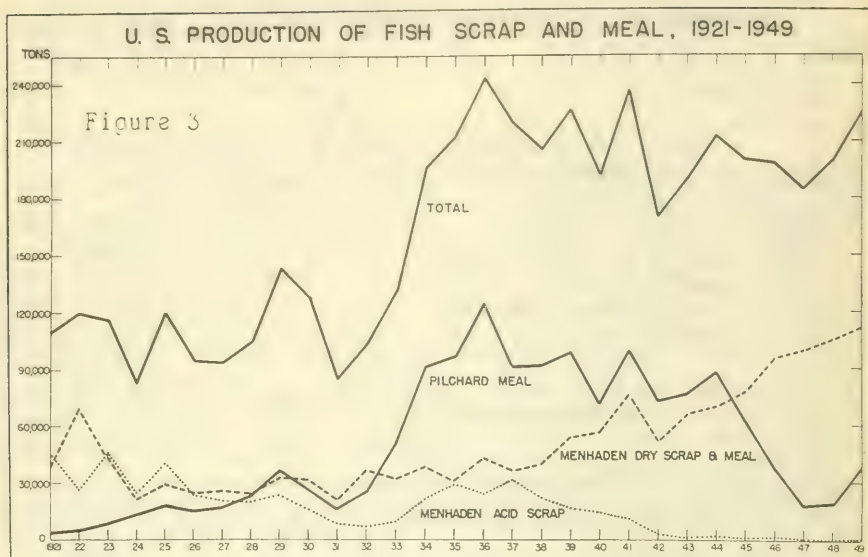
The raw material is derived from two sources--whole fish caught specifically for reduction purposes and fish waste from filleting, canning, and other fisheries processing (Figure 2). Fully 2,250 million pounds of fish was processed by meal and oil manufacturers in 1949.

Rendering plants utilize two principal species of fish--menhaden and pilchards. The menhaden catch last year was 1,069 million pounds, while that of pilchards amounted to 640 million pounds.



The pilchard catch in the Pacific reached a high of 1,500 million pounds in 1936, but following that year the catch fluctuated between 800 and 1,300 million





pounds. After 1945, it declined sharply to a low of 250 million pounds in 1947, but then increased again. While the catch of pilchards was fluctuating, the menhaden catch in the Atlantic and Gulf of Mexico increased to record levels.



### U. S. Production of Menhaden Products, 1949

Receipts of menhaden by manufacturers of menhaden products in 1949 amounted to 1,068,622,995 pounds (1,594,959,694 fish). This was the largest catch in the

Table 1 - Manufacturers' Receipts of Menhaden and Production of Menhaden Products, 1949<sup>1/</sup>  
(Quantity and Value to the Manufacturer)

States	Menhaden Utilized	Products Manufactured				
		Dry Scrap and Meal		O i l		Total
		Pounds	Tons	Value (\$)	Gallons	
New Jersey .....	157,582,459	16,620	2,549,391	1,570,065	714,605	3,263,996
New York and Delaware .....	249,684,210	2/25,303	2,763,875	2,428,176	1,100,000	4,863,875
Virginia .....	126,430,336	15,100	2,417,735	739,442	292,971	2,710,706
North Carolina .....	227,679,400	2/23,016	3,421,841	751,687	259,901	3,681,742
Florida .....	54,919,900	6,070	1,006,765	259,834	93,262	1,100,027
Mississippi, South Carolina, Louisiana, and Texas .....	252,326,690	26,139	4,495,917	2,383,805	933,844	5,429,761
Total .....	1,068,622,995	112,248	17,655,524	8,133,009	3,394,583	21,050,107

<sup>1/</sup>Does not include the production of menhaden condensed solubles.

<sup>2/</sup>A small production of acidulated scrap has been included with the production of dry scrap and meal.

3/1,594,959,694 fish.



history of the fishery, and was the second successive year that the yield exceeded one billion pounds.

In 1949, menhaden products were manufactured in 9 plants in North Carolina; 6 in Virginia; 4 in Florida; 3 in New Jersey; 2 each in Delaware, Mississippi, and Louisiana; and 1 each in New York, South Carolina, and Texas.

Table 2 - Menhaden Utilized and Production of Menhaden Products, 1940 to 1949  
(Quantity and Value to the Manufacturer)

Year	Menhaden Utilized Pounds	Products Manufactured						
		Dry Scrap and Meal		Acidulated Scrap		O i l		Total
		Tons	Value (\$)	Tons	Value (\$)	Gallons	Value (\$)	
1949	1,068,622,995	1/112,248	1/17,655,524	1/	1/	8,133,009	3,394,583	21,050,107
1948	1,007,888,840	1/104,058	1/11,560,914	1/	1/	8,763,939	10,132,179	21,693,093
1947	948,155,592	98,602	10,893,852	632	26,863	8,473,371	11,425,497	22,336,212
1946	916,013,079	94,622	8,605,118	2,022	78,475	9,758,648	9,033,032	17,716,625
1945	759,073,820	77,451	5,483,377	1,577	62,200	8,335,094	5,656,550	11,202,127
1944	685,980,170	69,170	4,913,224	2,922	111,104	6,067,111	3,725,498	8,749,826
1943	615,554,460	66,357	4,766,672	1,555	58,821	5,734,668	3,892,142	8,717,635
1942	432,643,880	50,504	3,362,279	2,594	80,520	5,128,760	3,200,129	6,642,928
1941	775,086,820	75,316	4,008,355	11,029	242,792	6,034,050	2,829,441	7,080,583
1940	654,589,000	56,249	2,423,229	15,520	271,533	5,774,671	1,304,720	5,999,482

1/A small production of acidulated scrap has been included with dry scrap and meal.

Since the founding of the Nation the catch of menhaden by United States fishermen has been far greater than that of any other species. Data on the catch of menhaden (which are available for most of the last 76 years) indicate that during this period about 35 billion pounds of menhaden were taken for manufacture into meal and oil.



## U. S. Pacific Coast States Pack of Canned Salmon, 1949

The 1949 pack of canned salmon in the Pacific Coast States amounted to 1,133,325 standard cases, valued at \$22,167,812 to the canners. Compared with 1948, this was

Table 1 - Pacific Coast States Pack of Canned Salmon by Species and Area (Quantity and Value to Canners)											
Species	Puget Sound			Columbia River			Coastal			Total	
	Std. Cases	Avg. Price Per Case	Total Value	Std. Cases	Avg. Price Per Case	Total Value	Std. Cases	Avg. Price Per Case	Total Value	Std. Cases	Total Value
Chinook or King	21,622	\$19.33	\$417,992	133,073	\$30.47	\$4,055,146	3,166	\$20.43	\$64,554	157,861	\$4,537,826
Chum or keta	199,225	14.49	2,887,121	10,797	15.54	167,791	9,630	14.18	136,534	219,652	3,191,446
Pink	553,987	15.94	8,832,216	-	-	-	-	-	-	553,987	8,832,216
Red or sockeye	93,520	31.18	2,915,749	6,592	35.98	237,187	7,689	34.64	266,365	107,801	3,419,201
Silver or coho	53,316	21.14	1,145,829	15,466	30.15	466,562	5,161	20.17	104,081	85,143	1,945,472
Steelhead	-	-	-	8,881	27.43	243,575	-	-	-	8,881	243,575
Total	931,870	19.59	16,395,887	175,809	29.58	5,200,261	25,646	22.29	571,664	1,133,325	\$22,167,812

Note: "Standard cases" represent the various-sized cases converted to the equivalent of 48 one-pound cans, each can containing 16 ounces.

an increase of 40 percent in volume, but a decline of 8 percent in value. The Puget Sound district of Washington accounted for 82 percent of the 1948 pack; the Columbia River districts of Oregon and Washington, 16 percent; and the coastal districts of the three states, 2 percent.

Salmon were canned at 34 plants in Washington, 11 in Oregon, and 3 in California.

\* Does not include canned salmon pack in Alaska.

Table 2 - Pacific Coast States Pack of Canned Salmon, 1940-49

Year	Chinook or King	Chum or Keta	Pink	Red or Sockeye	Silver or Coho	Steelhead	Total
	Std. Cases	Std. Cases	Std. Cases	Std. Cases	Std. Cases	Std. Cases	Std. Cases
1949 ...	157,861	219,652	553,987	107,801	85,143	8,881	1,133,325
1948 ...	285,266	276,158	4,480	97,907	125,647	20,617	810,075
1947 ...	300,029	2/185,992	628,300	37,095	155,842	22,782	1,330,040
1946 ...	164,898	1/163,474	160	283,935	25,505	17,029	655,001
1945 ...	139,262	1,214	301,376	53,130	43,580	19,207	557,769
1944 ...	167,070	1,669	490	38,061	17,809	20,489	245,588
1943 ...	134,225	9,387	62,025	21,610	32,383	16,259	275,889
1942 ...	272,151	149,010	789	282,105	33,728	21,249	759,032
1941 ...	320,817	150,244	154,475	143,837	97,570	32,646	899,589
1940 ...	238,425	63,063	2,234	86,451	107,059	38,431	535,663

1/Includes 94,712 cases of smoked salmon which were not reported by species.

2/Includes 814 cases of smoked salmon which were not reported by species.



## U.S. Pack of Canned Tuna and Tuna-Like Fish, 1949

A new record pack of tuna and tuna-like fish was produced in 1949. A total of 7,290,320 standard cases was packed, valued at \$97,710,325 to the packer.

Table 1 - Pack of Canned Tuna and Tuna-Like Fish by Species and States, 1949 (Quantity in Standard Cases &amp; Value to the Cannery)

Species	CALIFORNIA			WASHINGTON AND OREGON			MAINE, MARYLAND, & MASSACHUSETTS		
	Quantity Std. Cases	Total Value	Avg. Price Per Std. Case	Quantity Std. Cases	Total Value	Avg. Price Per Std. Case	Quantity Std. Cases	Total Value	Avg. Price Per Std. Case
Tuna:									
Albacore .....	1,022,957	15,471,412	15.12	443,892	6,278,902	14.15	-	-	-
Yellowfin .....	3,753,906	49,273,930	13.13	149,897	2,139,007	14.37	-	-	-
Bluefin .....	76,877	999,642	13.00	-	-	-	-	-	-
Skipjack .....	1/1,384,019	1/17,708,064	12.79	54,969	784,608	14.27	-	-	-
Tonno .....	168,642	2,579,943	15.30	-	-	-	-	-	-
Miscellaneous ...	-	-	-	-	-	-	2/76,334	2/804,289	10.54
Total tuna .....	6,436,401	86,032,991	13.43	647,718	9,202,517	14.21	76,334	804,289	10.54
Tuna-Like Fish:									
Bonito .....	33,734	365,444	10.83	-	-	-	-	-	-
Yellowtail .....	126,133	1,305,084	10.35	-	-	-	-	-	-
Total tuna-like fish .....	159,867	1,670,528	10.45	-	-	-	-	-	-
1949 Grand Total ..	6,596,268	87,703,519	13.36	647,718	9,202,517	14.21	76,334	804,289	10.54
1948 Grand Total ..	6,437,996	101,583,988	15.77	572,890	10,726,050	18.72	26,729	360,268	13.48

1/Includes a small production of Atlantic Coast little tuna.

2/Includes little tuna, bluefin tuna, and yellowfin tuna.

Note: "Standard cases" represent cases of various sizes converted to the equivalent of 48 No. 1 tuna cans to the case, each can containing 7 ounces net weight of solid-packed meat or 6 ounces net weight of flakes or grated meat.

Table 2 - Pack of Canned Tuna and Tuna-Like Fish by Species, 1947-49 (Quantity in Standard Cases &amp; Value to the Cannery)

Species	1949 Total			1948 Total			1947 Total		
	Quantity Std. Cases	Total Value	Avg. Price Per Std. Case	Quantity Std. Cases	Total Value	Avg. Price Per Std. Case	Quantity Std. Cases	Total Value	Avg. Price Per Std. Case
Tuna:									
Albacore .....	1,466,849	21,750,314	14.83	1,299,243	24,559,318	18.90	716,029	14,081,736	19.67
Yellowfin .....	3,902,763	51,412,937	13.17	4,017,953	62,352,835	15.52	3,162,175	47,381,523	14.98
Bluefin .....	76,877	999,642	13.00	1/148,778	2,378,079	15.98	447,853	6,933,961	15.48
Skipjack .....	1/1,408,908	1/16,492,872	12.88	1,000,430	16,895,504	15.51	969,101	14,327,124	14.78
Tonno .....	168,642	2,579,943	15.30	89,167	1,542,508	17.30	69,995	1,262,918	18.04
Miscellaneous ...	2/76,334	2/804,289	10.54	57,827	850,724	14.69	82,321	1,106,066	13.44
Total tuna .....	7,129,423	98,039,797	13.47	5,863,476	107,978,968	18.50	5,447,554	85,093,328	15.62
Tuna-Like Fish:									
Bonito .....	33,734	365,444	10.83	185,363	2,392,346	12.91	260,943	3,304,847	12.67
Yellowtail .....	126,133	1,305,084	10.35	188,775	2,836,582	11.66	185,998	2,211,001	11.89
Total tuna-like fish .....	159,867	1,670,528	10.45	374,139	4,631,338	12.38	446,941	5,515,847	12.34
Grand Total .....	7,290,320	99,710,325	13.40	6,237,615	112,610,296	18.00	5,894,495	90,609,175	15.37

1/Includes a small production of Atlantic Coast little tuna.

2/Includes little tuna, bluefin tuna, and yellowfin tuna.

Note: Cases of various sizes converted to the equivalent of 48 No. 1 tuna cans to the case, each can containing 7 ounces net weight of solid-packed meat or 6 ounces net weight of flakes or grated meat.

This was an increase of 4 percent in quantity, but a decline of 13 percent in value as compared with the previous year. The average price per standard case declined from \$16.00 in 1948 to \$13.40 in 1949.

Table 3 - Pack of Canned Tuna and Tuna-Like Fish, 1940-49  
(Quantity in Standard Cases<sup>1</sup> and Value to the Cannery)

Year	Quantity Std. Cases <sup>1</sup>	Total Value \$	Avg. Price Per Std. Case \$	Year	Quantity Std. Cases <sup>1</sup>	Total Value \$	Avg. Price Per Std. Case \$
1949 ..	7,290,320	97,710,325	13.40	1944 ..	3,560,020	40,836,117	11.80
1948 ..	7,037,758	112,612,296	16.00	1943 ..	2,696,073	31,430,189	11.66
1947 ..	5,894,495	90,609,175	15.37	1942 ..	2,484,749	30,742,493	12.37
1946 ..	4,784,484	59,135,823	12.36	1941 ..	2,931,581	19,397,887	6.62
1945 ..	4,531,565	47,407,451	10.46	1940 ..	4,188,460	23,727,560	5.66

<sup>1</sup>/Cases of various sizes converted to the equivalent of 48 No. 5 tuna cans to the case, each can containing 7 ounces net weight of solid-packed meat or 6 ounces net weight of flakes or grated meat.

California firms packed 6,566,268 cases (90 percent of the total); followed by Oregon with 539,964 cases; Washington, 107,754 cases; and the states of Maine, Massachusetts, and Maryland--76,334 cases.



## U.S. Pack of Canned Shrimp, 1949

The United States pack of canned shrimp in 1949 amounted to 664,721 standard cases (48 5-ounce cans), valued at \$11,203,325 to the packers. This was an increase

Table 1 - Pack of Canned Shrimp by States, 1949			Table 2 - Pack of Canned Shrimp by Size of Can, 1949			
State	Quantity Std. Cases <sup>1</sup>	Value \$	Size	Quantity Actual Cases	Value \$	Packers' Price \$ Per Std. Case
Mississippi .....	116,314	1,967,274	5 ounces net (48 cans) .....	645,116	10,866,777	16.88
Louisiana .....	495,800	8,371,199	7 ounces net (48 cans) .....	4,373	90,505	20.70
Georgia, Alabama, and South Carolina ...	52,607	864,852	Other sizes (std. cases) ...	13,483	226,043	16.77
Total .....	664,721	11,203,325	Total .....	662,972	11,203,325	-

<sup>1</sup>/Standard cases represent the various-sized cases converted to the equivalent of 48 cans of 5 ounces each.

of 105,851 cases as compared with the previous year, and was the largest pack since 1942. However, the 1949 pack was only 47 percent as great as the record 1937 production of 1,412,702 cases.

Table 3 - Pack of Canned Shrimp, 1940-49 (Quantity and Value to the Cannery)

Year	Quantity Std. Cases <sup>1</sup>	Value \$	Packers' Price \$ Per Std. Case	Year	Quantity Std. Cases <sup>1</sup>	Value \$	Packers' Price \$ Per Std. Case
1949 ..	664,721	11,203,325	16.85	1944 ..	561,649	4,854,799	8.64
1948 ..	558,870	7,791,313	13.94	1943 ..	660,436	5,360,647	8.12
1947 ..	472,333	8,192,004	17.34	1942 ..	965,352	7,347,330	7.65
1946 ..	522,130	8,428,735	16.14	1941 ..	884,874	4,882,544	5.52
1945 ..	214,971	1,918,633	8.93	1940 ..	1,116,249	4,318,325	3.87

<sup>1</sup>/Standard cases represent the various-sized cases converted to the equivalent of 48 5-ounce cans for both wet and dry pack.



Nearly 75 percent of the 1949 pack was canned in Louisiana, while Mississippi cannery accounted for 17 percent of the production.

Shrimp were canned in 17 plants in Mississippi, 35 in Louisiana, 2 each in Alabama and South Carolina, and 1 plant in Georgia.



## U.S. Pack of Canned Mackerel, 1949

In 1949, the United States pack of canned mackerel (including jack mackerel) amounted to 1,049,927 standard cases, valued at \$6,848,930 to the packers. This was a decline of 18 percent in quantity and 30 percent in value, compared with the previous year.

State	Quantity Std. Cases	Total Value	Avg. Price Per Std. Case	Size of Can and Case	Quantity Actual Cases	Total Value	Avg. Price Per Std. Case
Maine .....	19,021	127,420	6.70	15 ounces net, tall (48 cans) ...	962,688	6,187,087	6.43
Massachusetts ..	95,142	815,625	8.57	15 " " " oval (48 " ) ...	17,971	136,251	5.91
Maryland .....	18,954	139,473	7.36	15 " " (24 cans) .....	43,455	161,386	3.54
Total Atlantic Coast .....	133,117	1,082,515	8.13	14 " " (24 " ) .....	73,931	282,241	3.82
California .....	916,810	5,766,415	6.29	Other sizes (converted to standard cases) .....	12,087	112,265	9.29
Grand total ...	1,049,927	6,848,930	6.52	Total .....	1,112,032	6,848,930	-

<sup>1</sup>Includes the pack of jack mackerel in California.

<sup>2</sup>Standard cases represent cases of various sizes converted to the equivalent of 48 1-pound cans to the case, each can containing 15 ounces net of fish.

The California pack was 10 percent less than in 1948, while the production in the Atlantic Coast States declined 49 percent.

Mackerel were canned in 41 plants in California, 7 in Maine, 6 in Massachusetts, and 4 in Maryland.

Year	California			Atlantic Coast			Total		
	Quantity Std. Cases	Total Value	Avg. Price Per Std. Case	Quantity Std. Cases	Total Value	Avg. Price Per Std. Case	Quantity Std. Cases	Total Value	Avg. Price Per Std. Case
1940 ..	916,810	5,766,415	6.29	133,117	1,082,515	8.13	1,049,927	6,848,930	6.52
1941 ..	1,018,973	7,541,931	7.40	262,219	2,308,903	8.81	1,281,192	9,850,834	7.69
1942 ..	1,477,198	12,571,059	8.51	277,752	2,447,574	8.81	1,754,950	15,018,633	8.56
1943 ..	723,688	5,599,894	7.74	238,462	1,975,397	8.28	962,150	7,575,291	7.87
1944 ..	638,191	3,590,614	5.63	54,537	456,077	8.36	692,728	4,046,691	5.84
1945 ..	992,280	5,096,749	5.14	232,780	1,937,248	8.32	1,225,060	7,033,997	5.74
1946 ..	831,660	4,379,996	5.27	105,591	891,207	8.44	937,251	5,271,203	5.62
1947 ..	615,436	3,000,604	4.87	104,753	692,478	6.61	720,189	3,693,082	5.12
1948 ..	843,719	2,947,233	3.49	91,082	556,485	6.10	934,801	3,503,718	3.75
1949 ..	1,400,016	3,986,695	2.85	21,878	114,674	5.24	1,421,894	4,101,369	2.88

<sup>1</sup>Cases of various sizes converted to a case of 48 1-pound cans, each can containing 15 ounces net of fish.

Prices for standard cases to the cannery declined during the year. The biggest drop occurred in the California pack which declined from \$7.40 per case in 1948 to \$6.29 per case in 1949. Mackerel canned on the Atlantic Coast averaged \$8.13 per standard case in 1949, compared with \$8.81 in 1948.



## Wholesale and Retail Prices

WHOLESALE PRICES, APRIL 1950: In April this year the fish and shellfish (fresh, frozen, and canned) wholesale index was 95.5 percent of the 1947 average--2.3 percent below March 1950 and 8.7 percent lower than in April 1949, according to the Bureau of Labor Statistics of the Department of Labor. The biggest drop occurred in the prices of fresh and frozen fishery products, but mainly in the drawn, dressed, or whole fin-fish category. (See table 1.)

Table 1 - Wholesale Average Prices and Indexes of Fish and Shellfish, April 1950									
GROUP, SUBGROUP, AND ITEM SPECIFICATION	POINT OF PRICING	UNIT	AVERAGE PRICES (\$)			INDEXES (1947 = 100)			
			Apr. 1950	Mar. 1950	Apr. 1949	Apr. 1950	Mar. 1950	Apr. 1949	
ALL FISH AND SHELLFISH (Fresh, Frozen, and Canned)									
Fresh & Frozen:						95.5	97.7	104.6	
Drawn, Dressed, or Whole Fin Fish:						100.5	103.8	94.3	
Haddock, large offshore, drawn, fresh	Boston	lb.	.09	.10	.07	106.0	112.4	95.3	
Halibut, Western, 20/80 lbs., dressed, fresh or frozen	New York City	"	.35	.34	.33	103.2	99.2	95.6	
Salmon, king, lge. & med., dressed, fresh or frozen	" "	"	.46	.48	.47	112.2	117.1	115.2	
Lake trout, domestic, mostly No. 1, drawn (dressed), fresh	Chicago	"	.69	.62	.47	151.9	136.4	104.1	
Whitefish, mostly Lake Superior, drawn (dressed), fresh	"	"	.58	.60	.51	166.5	172.7	146.0	
Whitefish, mostly Lake Erie pound net, round, fresh	New York City	"	.63	.63	.57	141.5	142.4	127.7	
Yellow pike, mostly Michigan (Lakes Michigan & Huron), round, fresh	" "	"	.38	.58	.32	88.4	135.8	74.9	
Processed, Fresh:						91.9	92.1	91.7	
Fillets, haddock, small, skins on, 20-lb. tins	Boston	lb.	.30	.33	.25	106.4	119.5	88.5	
Shrimp, lge. (26-30 count), headless, fresh or frozen	New York City	"	.64	.63	.66	92.9	91.2	95.6	
Oysters, shucked, standards	Norfolk area	gal.	3.50	3.50	3.50	86.2	86.2	86.2	
Processed, Frozen:						102.5	103.0	97.2	
Fillets: Flounder (yellowtail), skinless, 10-lb. boxes	Boston	lb.	.40	.37	.24	127.5	119.4	77.1	
Haddock, small, 10-lb. cello-pack	"	"	.26	.28	.22	116.2	126.7	98.4	
Rosefish, 10-lb. cello-pack	Gloucester	"	.20	.21	.23	101.0	103.1	115.0	
Shrimp, lge. (26-30 count), 5- to 10-lb. boxes	Chicago	"	.64	.63	.64	92.9	91.1	92.6	
Canned:						88.0	88.6	120.3	
Salmon, pink, No. 1 tall (16 oz.), 48 cans per cs.	Seattle	case	14.53	14.53	22.66	94.7	94.7	147.7	
Tuna, light meat, solid pack, No. 2 tuna (7 oz.), 48 cans per cs.	Los Angeles	"	14.25	14.25	16.75	92.7	92.7	109.0	
Sardines (Pilchard), California, tomato pack, No. 1 oval (15 oz.), 48 cans per cs.	"	"	5.50	5.50	7.50	61.5	61.5	83.9	
Sardines, Maine, keyless oil, No. 2 drawn (3 1/2 oz.), 100 cans per cs.	New York City	"	7.38	7.75	8.75	72.3	76.0	85.8	

Wholesale prices for fresh and frozen fishery products during the month dropped 3.2 percent below March 1950, but were still 5.5 percent higher than the corresponding month in 1949.

Mainly due to lower prices on fresh drawn haddock, the drawn, dressed, or whole fin-fish prices were 5.7 percent lower in April 1950 as compared with the previous month, but 11.2 percent higher than in April 1949. Fresh drawn haddock prices during April dropped 12.5 percent below March 1950, but were still 24.7 percent higher than the corresponding month the previous year.

Although prices of fresh processed fishery products during the month were only 0.2 percent below March, fresh haddock fillet prices dropped 11 percent during the same period. However, an increase in shrimp prices compensated for the large decline in fresh fillet prices. Fresh haddock fillet prices were still 20.2 percent higher than in April 1949.

Frozen processed fish and shellfish prices during the month were 0.7 percent lower than in March, but 5.5 percent higher than in April 1949. Frozen flounder fillet and shrimp prices rose during the month, while frozen haddock and rosefish fillet prices dropped.

During April, canned fishery products at wholesale were priced only 0.7 percent below the previous month and were still 26.8 percent lower than in the corresponding month in 1949. Wholesale prices of canned pink salmon, California sardines, and tuna were quoted in April at the same level as in March, but Maine sardines were quoted 4.9 percent lower.

**RETAIL PRICES:** Food prices on the average rose 0.3 percent between March 15 and April 15 this year. The retail food price index on April 15 was 196.6 percent of the 1935-39 average, 3.1 percent lower than a year ago, but 35 percent above the June 1946 level. (See table 2.)

Item	Base	I n d e x e s		
		Apr.15,1950	Mar.15,1950	Apr.15,1949
All foods .....	1935-39 = 100	196.6	196.0	202.8
All fish and shellfish (fresh, frozen, & canned)	do	297.4	302.5	321.3
Fresh and frozen fish ....	1938-39 = 100	276.0	281.2	261.4
Canned salmon: pink .....	do	328.2	332.1	460.7

The retail index for all fish and shellfish (fresh, frozen, and canned) on April 15 was 297.4 percent of the 1935-39 average, 1.7 percent lower than on March 15, and 7.4 percent lower than on April 15, 1949. The decline was attributed to lower prices on most fresh and frozen fishery products, and slightly lower prices for canned fishery products.

The retail index for fresh and frozen fish on April 15 was 276.0 percent of the 1938-39 average, 1.8 percent below mid-March, but 5.6 percent higher than mid-April 1949. Canned pink salmon prices also dropped 1.2 percent from mid-March to mid-April and the index was 328.2 percent of the 1938-39 average. Canned pink salmon prices during April were still 28.2 percent below the corresponding period a year ago.







## Aden Protectorate

STATUS OF FISHERIES 1949: Little has been done to further or develop a fishing industry in Aden, states a May 4 American consular report from that country. According to reports submitted by the Government Fisheries Officer of the United Kingdom this area has potentialities for fisheries development. In British Somaliland, a small canning factory has been set up and it is exporting its products. In Mukalla, two Arab firms operate a dried fish and fish oil business, marketing their products mainly in India. All these fishing operations are on a small scale.

Aden has a fisheries officer doing research. Specimens are gathered and instruction is given to the natives on how to improve their fishing techniques and marketing.

The American Consulate reports that inquiries from American merchants interested in importing dried fish and fish oil from this locality have been received.



## Argentine Republic

CURRENT FISH MARKETING SITUATION:<sup>1/</sup> Because canned fish is a luxury item in Argentina, locally-produced food is plentiful, and the country suffers from a dollar shortage, it is almost impossible for Argentina to import canned fishery products at this time. This is the information submitted by Milton J. Lindner, who is covering the Eastern part of South America in a survey of South American markets for U. S. fishery products.

The Central Bank, which controls dollar permits, will not issue permits to export dollars for canned fishery products. The recent loan from the United States will not materially change this situation in the near future since the loan money will be used to pay the backlog of obligations and to purchase farm and transportation machinery which are in short supply.

<sup>1/</sup> This is the first report in a series to give information on current and potential markets for United States fishery products in South America. Milton J. Lindner and Robert O. Smith, United States Fish and Wildlife Service representatives, are now in South America investigating markets in connection with a survey sponsored cooperatively with the U.S. Department of Agriculture's Office of Foreign Agricultural Relations. More detailed reports will be issued at a later date as "Foreign Market Circulars" and will be available from the Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Washington, D. C.

The demand for canned fishery products is being met by increased local production of mackerel, which is packed as tuna, salmon, albacore, and "caballa" (the local name).

Beef is plentiful and cheap, being subsidized by the Argentine Government. Fresh beef of good quality retails from 14¢ to 25¢ per pound (U. S. currency equivalent), and canned mackerel of poor to fair quality from 50¢ to over \$1.30 per pound (U. S. currency equivalent), depending on type of pack.

Prior to the war, Argentina's principal fishery imports were dried cod, mostly from Norway and the United Kingdom; canned sardines, mostly from Spain; herring in brine, mostly from the Netherlands and the United Kingdom; and canned oysters, mostly from Spain. Imports from the United States were chiefly canned pilchards in tomato sauce. Imports were cut off during the war, but increased rapidly after the end of hostilities. Argentina, like many other countries, soon ran out of dollar exchange and by mid-1947 found it necessary to impose restrictions on imports and currency transactions. Very little canned or preserved fishery products have been imported in about two years. A few of the smaller shops still have U. S. canned salmon and oysters. The larger stores, with a greater turnover, have been out of these products for some time. Some frozen squid and octopus were observed in the market, apparently of Spanish origin, retailing at about 90¢ per pound (U. S. currency equivalent).

The Argentine catch of marine fishes is reported about 110 million pounds a year, of which mackerel accounts for about 32 million pounds, hake about 22 million, and anchovy about 13 million. Fresh-water fish production is about 33 million pounds annually, over half of which is sabalo, a species similar to the buffalo fish. Practically all the sabalo are processed for meal and oil.

In Buenos Aires, fresh fish is sold in the round, and selling prices are fixed by the Municipal Government. Ten large trawlers are operating, half of which are owned and operated by the Federal Government. These trawlers supply principally hake and sea trout to the fresh fish markets. A good variety and quality of fresh fish and shellfish are available.

The break in prices of shark-liver oil in the United States market and the prohibition on the imports of canned fishery products into Argentina, have resulted in the fishermen changing from shark to mackerel fishing to meet the changed market situation. Accordingly, shark-liver oil production declined from 23 trillion units of Vitamin A in 1946 to about 3.7 trillion units in 1949. The mackerel fishery increased from practically nothing in 1945 to over 32 million pounds in 1949.

All imports of canned and packaged fish must be labeled in Spanish to indicate: name of product, name of importer or local representative, net weight of contents, country of origin, and year and month of packing. Products having an acid reaction must be packed in enamel-lined cans.



## Australia

AUSTRALIAN TUNA EXPORT PROSPECTS: The Australian Assistant Trade Commissioner in San Francisco is optimistic about the Californian market for Australian tuna, reports the March 1950 Fisheries Newsletter issued by the Australian Director of Fisheries.

According to the Commissioner, the Californian industry was most interested in the trial shipment of Australian frozen tuna (in the round) to San Francisco, which arrived in excellent condition.

Although the Australian southern bluefin (Thunnus maccoyii) is not quite the same species as the California bluefin (Thunnus thynnus), it has been established that it is a light-meat tuna.

Australian fishermen catch the tuna by trolling and bleed the fish, and since the fish are handled individually, they are generally free from bruises. On the other hand, California fishermen catch bluefin mostly by purse seine and they are not generally bled.

Samples of Australian canned tuna also created a very good impression in California, according to the Commissioner. However, whereas round tuna is admitted into the United States duty-free, the canned tuna is assessed a duty of 22½ percent ad valorem.

The Commissioner indicated that he had reason to hope that in the not too distant future there would again be direct steamer connections between Sydney and San Francisco obviating consignment to Vancouver for transshipment. This transshipment doubles the freight cost between Sydney and San Francisco.

NEW SPINY LOBSTER PROCESSING TECHNIQUE DEVELOPED: Australian exports of spiny lobster tails (crayfish) have become quite an important factor in the economy of the producing States, particularly, Western Australia and South Australia. Since most of the tails are exported to the United States, the spiny lobster industry is of national importance as a dollar-earner, states the March 1950 Fisheries Newsletter.

The rapid growth of this industry has brought out the need for rapid development of techniques in the handling of spiny lobsters and in the freezing and transportation of the "tails."

Since the Australian Department of Commerce and Agriculture requires that the anus and digestive tract be removed, several methods of doing this have been developed.

However, an employee of one of the processing companies in Geraldton, Western Australia, has recently invented and patented a device for removing the anus and digestive tract. The use of this device will probably supersede all previous methods employed.

The invention is a new vacuum-type machine. A vacuum pump is connected by suitable piping to a vacuum tank (the larger the better), to which is fitted a vacuum gauge. Leading from this vacuum tank is a connecting pipe which leads to a lidded receptacle. The latter is fitted with an air-tight lid, on the underside of which is fixed a baffle that goes down into the receptacle some eight



inches. The connecting pipe from the vacuum tank is fitted into the lid of this receptacle on one side, and leading away, on the other side, is a flexible-hose pipe, into the end of which is fitted a stainless steel tube, threaded and fitted with washers to take the cutting tool. The cutting tool is a screw-on nickel-steel drawn pipe made razor-sharp at the cutting end, which is sufficiently large to fit over the anus. Continuous operation is allowed by having spare, sharp cutting tools.

In operation, this cutting tool is placed over the anus. The suction causes the skin around the anus to be drawn tightly against the cutting edge, thus stretching the skin to some extent and making it easy for the operator, by the exertion of hardly any pressure, to completely sever the anus. The anus, with the digestive tract, is then drawn along the flexible hose into the receptacle, hits the baffle plate, and falls to the bottom. If desired, two or more flexible hoses from the lid to the operating tables can be used, in which case a larger vacuum tank is necessary. The vacuum maintained in the plant at Geraldton was 10 inches. After the removal of the anus and the digestive tract, the operator can, if he sees any blood or dirt, quickly remove it from the tail by the vacuum process. No part of the digestive tract or contents is left behind.

An officer of the Australian Department of Commerce and Agriculture has visited practically all packing establishments throughout Australia and has inspected a large number of "tails" from which the digestive tracts have been removed by various methods. In his opinion, the method just described gives a result which is hygienic and speedy in performance, and leaves nothing to be desired as far as compliance with the Australian export health regulations is concerned.

A more recent development of the industry is the use of the flesh in the claws and the body for the production of packaged, frozen, cooked spiny lobster meat (crayfish meat). After the separation of the raw tail for export, the remainder of the spiny lobster is cooked and the meat removed.

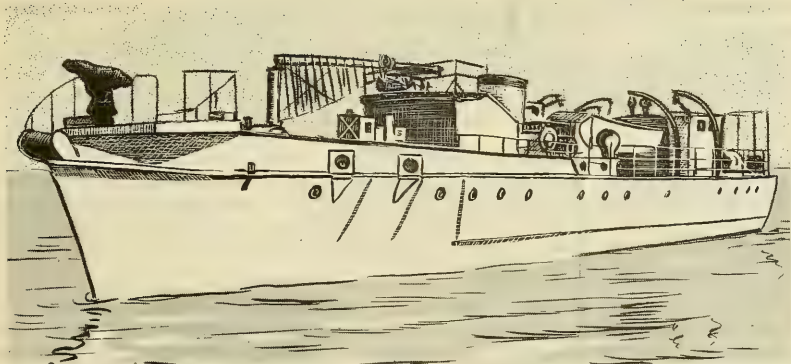
WHALING INDUSTRY: The one Australian whaling company hopes to capture 400 humpback whales this season, which began in June.

This company has two catcher boats, but for nearly all of its first season (1949) it had only one chaser working at a time. Last season (between July 5 and October 12) the company took 190 whales from which 1,000 metric tons of oil was obtained. The company, which operates from Point Cloates, Western Australia, hopes to obtain a higher yield this year.

Just before the end of last season a meal factory began production and turned out about 60 metric tons of 76-percent protein meal. This meal and the guano made from the rest of the offal were sold locally. All the oil was sold to the Dutch Government. The factory is now equipped to handle four whales a day.

All of the whales captured last season were taken within a radius of about 50 miles. This season the chasers are equipped with radiotelephone enabling them to keep in touch with the factory. Each chaser carries a crew of nine, comprising gunner, mate, two engineers, four seamen, and a cook.

About \$224,000 has been invested in this whaling company. The largest number of men employed in the factory last season was 105 and it is expected that



ONE OF TWO CHASERS USED BY THE AUSTRALIAN WHALING COMPANY OPERATING OUT OF POINT CLOATES, WESTERN AUSTRALIA. NOTE FOLDED MAST TO GET UNDER LOW BRIDGES AND ON FOREDECK THE TRACTOR WHICH SERVES AS A WINCH FOR PLAYING WHALES.

about the same number will be employed this year. The manager of the company reports that the average earnings of the workers, based on wages and bonus, were about \$56.00 per week plus free living quarters. Meals cost \$5.60 per week per man.

\* \* \* \* \*

GOVERNMENT COMMISSION TO COMMENCE WHALING: The Australian Whaling Commission expects to commence whaling in June this year from its first base at Babbage Island, Carnarvon, Western Australia. It plans to produce 4,500 tons of whale oil, 3,000 tons of meal, and 6,000 tons of whale solubles from a catch of 600 whales in its first season, according to the February 1950 Fisheries Newsletter.

After investigating the possibilities of establishing a whaling industry on a national basis, it was decided that a combination of circumstances made operation of a factory ship in the Antarctic uneconomical, and that a shore station should be established. Legislation was passed bringing into being the Australian Whaling Commission.

Catching operations will be conducted with three catchers. One is being built (Clyde), a second (Southern Breeze) has been purchased in South Georgia; and to date no definite move has been made to purchase a third catcher.

Southern Breeze is 137 ft. x 26 ft. x 13 ft. 7 inches, with a gross metric tonnage of 344, and a speed of 13 to 14 knots. The Clyde is 160 ft. x 31 ft. x 17 ft. 6 inches (moulded), with a gross tonnage of 600, and a speed of 15 knots. Delivery of this vessel is scheduled on May 1, 1950.

A prefabricated steel building (220 ft. x 135 ft.) will enclose a 2-stage flensing deck and all processing equipment, as well as providing store and warehouse facilities.

Most of the technical staff and skilled operatives will be Norwegian, but there will be a proportion of Australians who will be trained for the expansion of the industry.



## Canada

FEDERAL-PROVINCIAL CONFERENCE ON FISH INSPECTION: Representatives of the ten Canadian provincial fisheries services met with senior officers of the Federal Department of Fisheries in Ottawa on April 24 to discuss problems associated with the inspection of fish under the new Canadian Fish Inspection Act, reports the April 1950 Trade News of that agency.

At this meeting the fish inspection procedures were outlined. Discussions were held on the over-all implications of the Federal Government's revised Fish Inspection Act, and the steps the provinces may be requested to take in the way of enabling legislation to supplement the Act, when it is proclaimed. The majority stated the provinces would pass complementary and enabling legislation to the new Act when it becomes operative. Some provinces already have their own fish inspection acts, and one of the main purposes of the discussions was to clarify the fields which should be administered by the Federal and provincial authorities, and promote the coordination of administration and legislation on a uniform basis.

The meeting considered desirable the Federal suggestion to ask the fishing industry to cooperate in a zone test to ascertain the amount which domestic fish sales could be increased through higher quality products, coupled with advertising and a consumer education.

Regulations applying to the inspection of whitefish, and the application of compulsory inspection of export shipments of this species were also discussed. To date whitefish inspection has been on a voluntary and trial basis. A notice will be issued when the proposed compulsory product inspection regulations, with whatever amendments are necessary, are to become effective.

FISHERIES PRICES SUPPORT BOARD A PERMANENT BODY: A bill passed by the Canadian House of Commons in March made the Fisheries Prices Support Board a permanent body, according to the Trade News.

The Board was set up when it was expected that the fishing industry might find difficulty in readjusting itself to normal trade conditions after the greatly expanded activities brought about by World War II.

Since the Board's creation in 1947, it had been necessary to have its existence approved annually by Order-in-Council.

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CONFEDERATION AND NEWFOUNDLAND'S FISHERIES: One year after the entrance of Newfoundland into the Canadian union, it has become possible to state definitely that the effects of union upon the vital export trade of Newfoundland appear to be negligible. However, measures proposed for Federal support of fisheries may,



when enacted and implemented, provide some assistance to the Island's faltering trade in salt cod, an April 18 American consular dispatch from St. John's reports.

While the condition is unrelated to confederation, Newfoundland is experiencing an economic depression basically attributable to the complete dependence of the province upon limited types of world trade. Among the depressing influences is the weakness of demand for salt cod and fish oils.

Despite the new relation with Canada which Newfoundland enjoys as the result of confederation, and the economic assistance which that union has made possible, the Newfoundland economy is basically colonial and perilously dependent upon world markets for a limited group of primary products of the forests, fisheries, and mines. The markets for these products, partly as the result of currency devaluations and partly as a postwar readjustment to normal long term trends, became depressed during 1949 and the depression will probably continue with little abatement throughout 1950.

The salt cod trade, which revived under the stimulus of war demand, is in serious difficulties, of which the inability of customary consuming countries to make purchases in sterling or dollars, is but one. The growth of national fishing fleets, changes in consumer preferences away from salt cod, together with antiquated methods of production have contributed to the long-term difficulties in which this phase of Newfoundland's fishery finds itself.

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NEWFOUNDLAND'S FISHERIES DEPRESSED: Salt Cod Fisheries: The market for salt cod, the principal product of Newfoundland's fisheries, remained weak during the first quarter of 1950, a May 4 American consular dispatch from St. John's states. The 1949 salt-cod production, which was greater than that of 1948, moved into market channels much more slowly than in former years. Considerations of price and exchange difficulties, as well as competition and consumption trends away from salt fish appear principally responsible for lack of export demand for salt cod.

Price uncertainties for salt cod and the probability that prices offered would not meet production costs for the Labrador-cure type of salt cod, for which foreign demand has decreased, forecast some difficulty for fishermen in securing supplies and financial backing for the 1950 season, and probably means an abandonment of the Labrador cod fisheries.

Assistance in the marketing of approximately one-third of the annual production of salt cod in European areas is promised by the Canadian Government, but the issue of the price to be paid to fishermen was to be determined by free market conditions rather than by agreement and Government support as had been hoped by the fishermen themselves. In 1948 and 1949, agreement was reached among fish exporters, merchants, and fishermen for a minimum price, but no such agreement has been made for 1950 production. The price of salt cod to producers is expected to fall, and will probably result in reduced employment in the fisheries.

As of March 20 this year, stocks of salt cod amounted to 44,302,600 pounds, compared to 20,769,840 pounds on the same date in 1949.

Frozen Fish: It is believed that production of frozen fish and fillets is being maintained at 1949 levels, since the market for frozen fillets, which is in the United States, is considered firm.

Fish-Production Improvement Planned: The Provincial Government of Newfoundland is giving some attention to improvement of fish production and has recently sent a representative to observe fishing methods and equipment employed in the Scandanavian countries. Several Icelandic vessels have been engaged by the Government to demonstrate fishing methods and to explore areas for herring.



## Chile

FISH OILS: Production of industrial fish oils in Chile is still very limited, according to fishing experts. Produced as a byproduct by fish-meal plants, not more than 100 metric tons are estimated to be produced annually, reports a May 3 American consular dispatch from Santiago. However, this output is subject to increase as the various fish meal plants under construction and contemplated for the future go into operation.

Chile has also been producing shark and other fish liver oils for pharmaceutical purposes for many years. Its total output and local consumption are not known, but in 1949 it exported 61 metric tons, 57 percent of which went to the United States and the remainder to France.

WHALING INDUSTRY, 1949: Two Chilean companies engage in whaling—the largest has its principal offices in Valparaiso and the other (which is quite small) is located in Palcahuano.

The large firm has five whaling vessels and a land station at Quintay, not far from Valparaiso. The whaling operations of this company were begun during the war to provide substitute materials for tallow and other scarce fats in its manufacturing processes. In 1949, this company caught and processed 230 baleen whales and 680 sperm whales. The baleen whales yielded 795 short tons of oil, and the sperm whales, 2,866 short tons—a total oil production of 3,661 tons for this company, whose whaling activities are an adjunct to its extensive and diversified soap and manufacturing activities. Over 90 percent of this company's output is used in the manufacture of soaps, the remainder (baleen oil) goes into its production of margarine.

Table I - Chile's Whale and Sperm Oil Production, 1944-49 1/						
Kind	1949	1948	1947	1946	1945	1944
	.....(in short tons).....					
Baleen.....	795	2,021	2/	948	868	188
Sperm.....	2,866	2,911	2/	2,342	2,942	2,395
Total....	3,661	4,932	4,279	3,290	3,810	2,583
1/ Production of the Compania Industrial only—the larger of the two Chilean companies engaged in whaling.						
2/ Not available.						

The smallest company's production is negligible. When this firm at Palcahuano cannot sell its production to the large Valparaiso firm for hydrogenation and use in the latter firm's soap factory, the Palcahuano firm sells its production to small soap factories located in the south of Chile.

## Egypt

RESTRICTS FISHING BY FOREIGNERS: Egyptian fishing in the Red Sea for many years has been in the hands of Greeks who owned or captained the fishing boats, according to a May 9 American consular dispatch from Cairo. Last year the Government refused fishing permits to foreigners and the catch dropped by more than half. In addition, the Government also restricted the use of motor fishing boats to favor the small sailing ships owned by Egyptians. Therefore, the price of fish has been going up at an alarming rate.

At the beginning of April this year, the Government relaxed many of these restrictions, permitting the motor ships to resume work, and allowing a number of foreigners to use their boats. This has resulted in about 68,750 pounds of fish being delivered to markets in one day, and consequently prices of fish in Cairo have declined somewhat.

The Government is not allowing unrestricted operations by foreigners or by large modern fishing vessels, stating that it is still necessary to preserve the industry for Egyptians and to conserve the supply of fish.



## German Federal Republic

NEW GERMAN PROCESS FOR CANNING FISH: A new German mechanical fish-canning process, which is claimed to reduce canning costs up to 35 percent, was reported recently.<sup>1/</sup> The following additional information has been obtained on this process (known as the Hartmann light-ray blanching method) from an article, "New Processes in the Canning of Fish," which appeared in the German publication Die Fischwaren und Feinkostindustrie of February 1950.

According to the article, researchers investigating the various blanching methods developed in America, in particular, blanching by the use of high-frequency currents (high-frequency heating, infrared rays, and ultraviolet rays), did not go beyond the experimental stage in this field. Following lines of thought similar to those developed by the Americans, the German fish industrialist Karl Hartmann, Kiel-Gaarden, and the engineer Pawlowski developed the principle of ultrared light radiation during the past months into a new fish-canning process for canned herring which gives it a taste like that of canned sardines.

The invention per se and the uniqueness of the Hartmann method is a continuously operating blanching process. This principle was applied in practice in accordance with the ray-depth effect of the arc-ray receiver used in medicine. The rays of the invisible spectrum call for a process similar to cooking of the merchandise which, however, works from the inside toward the outside, rather than the opposite. Therefore, the treated fish is not blanched excessively, as indicated by the undamaged skin of the herring. The light bath extracts the superfluous cell water of the fish, thereby causing the desired shrinkage.

The processing of the sardine-like product (Oelhartinas) is as follows:

After washing, the herrings are scaled and cut the length of the club-size can. Pickling, which follows, supplies the required salt content of the herring. After drying, the fish--still raw--are packed

<sup>1/</sup> See Commercial Fisheries Review, April 1950, p. 62.



into the containers. Next, the containers are lined up on flat tin boxes, seventeen to the box, and are put into the receiver of the large ray apparatus. A special lid arrangement of perforated tin prevents the fish or cans from dropping out. The containers move



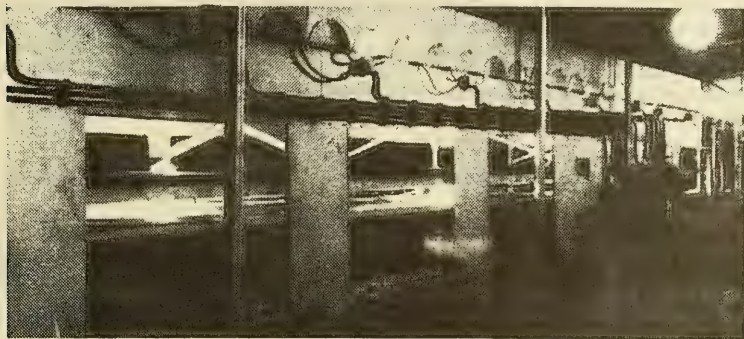
CANS PACKED WITH RAW HERRING ARE LINED UP ON FLAT TIN TRAYS (17 CANS TO THE TRAY), AND ARE PUT INTO THE RECEIVER OF THE LARGE RAY APPARATUS. A SPECIAL LID ARRANGEMENT OF PERFORATED TIN PREVENTS THE FISH OR CANS FROM DROPPING OUT WHILE GOING THROUGH THE MACHINE.

through the apparatus by means of a chain belt. First, the cans pass through the light bath zone where the heating of the herring takes place. In this process, the cell water leaves the fish and collects on the bottom of the can. As soon as the containers have passed through the heat zone (the final temperature is approximately  $170^{\circ}\text{C}$ . or  $338^{\circ}\text{F}$ .) the chain belt makes one rotation. This causes the pouring of the cell water from the cans into a wide trough. The long traveling distance of 16 meters or 52.2 feet (length of apparatus) guarantees the complete removal of the water from the con-

tainers. At the end of the chain belt the boxes holding the cans are removed and are arranged laterally on another belt where the cans are filled with hot oil ( $70^{\circ}\text{C}$ . or  $158^{\circ}\text{F}$ .) by means of a special filling machinery. The shrinkage of the fish guarantees that the oil penetrates the entire contents of the can.

The cans are sealed without further delay by means of a completely automatic sealing machine (capacity 3,000 cans per hour), put into squirrel cages, and are then conveyed to the autoclave where sterilization takes place. When in operation the light-ray apparatus holds approximately 5,700 cans. It

is possible to blanch 50,000 cans during an 8-hour period. The heat-light boxes are operated by 60 kilowatts, a.c., per hour. For the starting of the chain belt a  $\frac{3}{4}$  h.p. motor is sufficient.



THE HARTMANN LIGHT-RAY BLANCHING METHOD ENTAILS THE USE OF THE APPARATUS PICTURED ABOVE, WHICH IS 52.5 FEET LONG.

It is claimed that the finished product is of excellent quality. The skin is not damaged in any way. The contents are tightly packed. Only very small traces of water remain in the oil. This water is completely absorbed by the herring during storage. Flavor and aroma are actually similar to that of sardines.

The new method of canning calls, however, for the acquisition of rather expensive apparatus. In its favor, on the other hand, is the lowering of production costs due to more effective methods of operation; savings in wages; savings in material through better use of the fish; and more economical distribution of oil.

It is hoped that experience with mass production and lower prices for containers will result in lower costs to both the manufacturer and consumer. The Hartmann method is protected by patents. However, a monopoly is not sought. In the course of its further development, this method is to be made available to other German fish canneries.

**NOTE:** The article was translated from German by Alfred R. Holfert, Commodity-Industry Economist, U. S. Department of Commerce.



## Gold Coast

**REVIEW OF THE FISHERIES:** Fish from the sea provides much of the protein in the diet of the inhabitants of the Gold Coast Colony and Ashanti Colony and, even at the height of the fishing season the demand is far from satisfied, an April 17 American consular dispatch from Accra reports.

Principal types of fish caught are two species of sardinella caught with gill nets; horse mackerel caught in seines; and tunny, shark, sailfish, and bream caught

on lines. Fishing is carried on from native canoes equipped with sails. There are an estimated 50,000 natives engaged in fishing operations along the coast.

The Customs tariff of the Gold Coast is nonpreferential, owing to international treaty obligations. Ad valorem rates range from 6-1/4 to 66-2/3 percent with most ad valorem imports dutiable at 15 percent. Imports are controlled by a strict licensing system to preserve dollars. No imports are allowed from hard-currency areas unless the article in question is deemed to be essential and is unobtainable from a soft-currency area.



## Greece

Sponge Fishery and Market, 1949: Sponge fishing represents approximately 20 percent of the fishing industry in Greece (the total industry producing around \$15 million a year, of which sponge fishing brings in about \$3 million), and is important to the Greek Government mainly because all sponges are exported, thus providing a source of badly needed foreign exchange.

The 1949 Greek sponge-fishing fleet, similar to that of 1948, was two months late in getting under way. The fact that the majority of the sponge-fishing boats did not leave port until around the middle of June 1949 is attributed to (1) a belated requirement, on the part of the British, that all Greek sponge fishermen operating in North African waters now under British jurisdiction be able to present new identification cards different from those required of them the previous year, and (2) delays in obtaining necessary government loans. This delay cost the industry approximately \$500,000 in loss of potential harvest.

Fishing Fleet and Number Engaged: Approximately 200 fishing boats of all types and sizes, supported by 65 or 70 auxiliary boats, composed the Greek sponge fishing fleet of 1949.

The number of divers and crew members were broken down into the following categories: divers and fishermen, 1,150 to 1,200; sailors, 1,100 to 1,200; auxiliary boat crews, 330 to 350.

The number of boats and men slightly exceed the most recently revised figures issued by the Greek Ministry of National Economy for the 1948 season.

Harvest, 1949: The total 1949 sponge catch is reported to be a little over 336,000 pounds (approximately 153 metric tons).

Table 1 - Greek Sponge  
Production, Quantity  
By Grades, 1948-49

Grade	Quantity	
	1949	1948
	lbs.	lbs.
A ...	143,000	176,368
B ...	88,000	88,184
C ...	99,000	44,092
D ...	6,000	11,023
Total..	336,000	319,667

Table 2 - Greek Sponge Production, Quantity By Type  
and Grounds, 1949

Type	Greek Waters	Off Cyrenaica	Off Tunisia	Off Egypt	Total
	(in pounds)				
Honeycomb .....	60,000	145,000	15,000	55,000	275,000
Turkey-cup & Turkey toilet ..	10,000	-	6,000	9,000	25,000
Zimocca .....	-	25,000	-	7,000	32,000
Elephant's Ear .....	-	-	4,000	-	4,000
Total .....	70,000	170,000	25,000	71,000	336,000



**Prices:** The 50 percent devaluation of the Greek drachma in September 1949 is said to have resulted in a reduction in the export price of Greek sponges of around only 20 percent, since Greek sponge producers immediately increased their prices by 30 percent. This change in prices is interpreted by the Ministry as a saving shared between the producer and the consumer, but he adds that from the standpoint of the Greek national currency, the devaluation of the drachma produced a drop of 15 to 20 percent in the amount of foreign exchange which might normally have been derived from future sales of Greek sponges.

Table 3 - Prices for Honeycomb Sponges by Grade, 1946-49  
(All Prices f.o.b. Greek Port)

Market and Grade	1949	1948	1947	1946
	..... (in U. S. dollars per pound) .....			
<b>Bengazi:</b>				
A .....	15.00-15.50	19.00-19.50	16.00-17.00	16.00-17.00
B .....	8.00-8.50	10.00-10.50	9.00-9.50	9.00-9.50
C .....	4.00-5.00	6.00-6.50	5.00-6.00	5.00-6.00
D and other .....	2.00-2.50	2.50-3.00	2.00-2.50	1.50-2.00
<b>Greek Island:</b>				
A .....	12.00-12.50	14.50-15.00	13.00-13.50	12.00-12.50
B .....	6.50-7.00	8.00-8.50	7.00-7.50	6.00-7.00
C and other .....	4.00-4.50	5.00-5.50	4.00-5.00	4.00-4.50

The prices of Turkey-cup, Turkey toilet, zimocca, and elephant's ear normally average between 10 and 12 percent higher than prices for Bengazi honeycomb, varying proportionately according to grade.

**Exports:** Only around 172,000 pounds (80 metric tons) of sponges were exported from Greece during the first 11 months of 1949; the bulk going to the following countries listed in order of volume: United States, United Kingdom, Switzerland, Germany, France, Sweden, Iceland, and Belgium—all other purchasers took less than one metric ton each. Exports of sponges in 1948 totaled 32 metric tons, valued at around \$717,000.

**Stocks:** There are available stocks from the 1947 sponge harvest of around 4,500 pounds, and close to 66,000 pounds left over from the 1948 sponge catch. Therefore, the 1949 harvest plus the stocks on hand indicate that around 436,500 pounds of all grades and types of sponges were the total stocks on hand at the beginning of 1950.

**Outlook for 1950:** Because production costs are high and prewar markets are not yet recovered, and because production by other Mediterranean countries is presenting a worrisome threat of competition, the Greek sponge producers and exporters are pressing for government assistance in expanding the industry. Government trade experts express the opinion, however, that the condition of the industry could be bettered from within itself and they do not anticipate recommending any form of government subsidy for sponge exports in the foreseeable future.

It would appear that if the production costs were lowered, and the fishing fleets could put in full seasons in the sponging areas, Greece could hold its own on the world sponge market in spite of such competition as is developing in the Mediterranean area.

**DIFFICULTIES ENCOUNTERED BY THE INDUSTRY:** A favorable effect on the marketing possibilities of Greek sponges because of the devaluation of the drachma is agreed to be rather dim in that other Mediterranean producers of sponges (Tunis, Italy, Dalmatia, and Egypt) have also devalued their currencies by 30 to 40 percent, resulting, so far as is known, in a corresponding drop in prices of their sponges abroad.

The Director of Fisheries, Ministry of National Economy, and a Greek merchant consulted agree that the Greek sponge industry is facing a crisis.

According to the Ministry's representative, every effort must be made to channel Greek sponges to Central Europe as well as to the United States, and particularly to Germany, which was one of the principal purchasers of Greek sponges prior to World War II. He says that if Germany could take \$1 million worth of Greek sponges, the American market would automatically be decongested and a balance between demand and supply would be established. He stresses that provision should be made in the various agreements with Central European countries for an increase in the percentage of sponges to be exported from Greece to those countries so that at least \$1 million worth could be diverted to Germany. In addition, exports of sponges are possible, and desirable he says, to the Netherlands, Denmark, Sweden, Czechoslovakia, Austria, Switzerland, Belgium, France, and Italy.

Great Britain was the principal importer of Greek sponges prior to World War II.<sup>1/</sup> Consumption in England has dwindled, however, because of its postwar financial weakness and the imposition of high import duties, and the Ministry implies that Greece has lost hope of meeting or exceeding its prewar exports of sponges to the United Kingdom for some time to come. The Director of Fisheries added that export trade in sponges should be financed by the Bank of Greece in the form of loans at reduced interest rates (credit de campagne) so that exporters may receive the help they need when they need it, and that they will not be forced to pay the prevailing high interest rates on loans contracted on the open market.

The Director's final suggestion was that all arrangements for sailing of the fishing fleets should be made far enough in advance of the sailing time to assure their departure at the very beginning of the sponge fishing season. These arrangements include the granting of adequate loans from official sources at reasonable rates; timely clarification and execution of all agreements and conditions necessary for granting Greek fishermen the rights to harvest sponges in foreign waters traditionally fished by them (Egyptian; beds off the former Italian colonies on the coast of Libya—Cyrenaica, Tripoli—now under British jurisdiction; and French North African waters—Morocco, Algeria, Tunisia); and timely delivery of parts necessary for boat repair, fishing supplies, and food rations. Most island fishermen depend for their livelihood entirely upon the proceeds from their sponges, and flour and other fishing supplies must be imported from the mainland. Among the points stressed by the merchant-source were: (a) That the Ministry of National Economy should cease considering sponges as necessities (in other words, that they should be considered as "passive" items and their marketing eligible for government favor in the form of subsidies and granting of foreign exchange); (b) Pro-

<sup>1/</sup> This market required that the sponges be bleached, as they were used mainly for pharmaceutical use, bathing, and other household purposes. Since the war, however, the United States has become the principal buyer of Greek sponges, and uses them primarily for industrial purposes; hence, bleaching is not required. The production costs and processing time is therefore reduced, but another economic problem is created in that a considerable number of workers are thus deprived of their prewar employment in this step of the sponge industry.

ducers must reduce their prices; (c) A way must be found to reduce the costs now burdening exporters, who have to pay as much as 20 to 25 percent interest on money borrowed by them from the Bank of Greece <sup>2/</sup> (In consumer countries the importers of Greek sponges should promote sponge sales through wider advertising schemes, stressing the point that "natural sponges are actually cheaper and cleaner than are artificial sponges."); (e) Fishing vessels should be fitted with suitable gasoline engines, which, if they sail on time, will give longer fishing seasons and by increasing the catch will reduce production costs; (f) American importers should be requested to reduce the prices at which Greek sponges are now offered for sale in the United States, as present retail prices of Greek sponges in the United States are considered exorbitant; (g) Charges of foreign governments for licenses for sponge fishing in their waters should be reduced, a point of illustration being the charge of about \$11,358 (at predevaluation rate of exchange) per license now levied by the Egyptian government on Greek fishing boats (This charge, plus payment of crews, operation of vessels, and distance traveled, obviously makes the production of Egyptian sponges a rather costly venture).

**DIFFICULTIES IN FISHING IN FOREIGN WATERS:** As yet there are no permanent safeguards of Greece's rights to fish sponges in foreign waters of the Mediterranean. The North African fishing beds now under jurisdiction of the British extend from the Tunisian border to the Egyptian border, but they are centered mainly around Tripoli and Benghazi. Under Turkish domination of Libya, Greeks were allowed "free fishing" here. Under the Italo-Greek treaty of 1926, mainland Greek fishermen were granted 50 percent of the sponge fishing licenses issued by the Italian government, the other 50 percent being granted to residents of

the Italian-owned Dodecanese Islands—the residents of which, however, were primarily Greeks. Licenses were issued at a nominal price (or free in exchange for the right of Italian boats to fish sardines in Greek waters), and they were not forced to sell to Libyan buyers. During the war there was no sponge fishing by Greek vessels off Tripolitania and Cyrenaica. In 1946, a few Greek boats were permitted to harvest sponges in Cyrenaica waters provided (1) the fishermen carried fishing licenses; (2) the vessels had special licenses to operate in these for-



HONEYCOMB SPONGE FROM THE MEDITERRANEAN SEA.

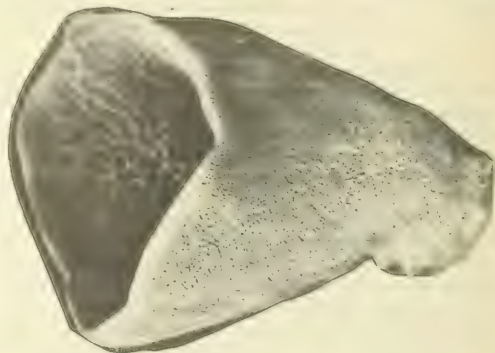
eign waters after payment of license fees, which varied according to the type of boat; (3) the entire sponge harvest be landed in Cyrenaican ports. Sales to Cyrenaican buyers were not required, but by landing the sponges on foreign soil, a fiction of import was established and an export tax was levied. This tax was set at 1 percent of the value of raw sponges, and 2 percent of the value of processed sponges. It is said to have usually happened, however, that after the sponges had been landed, all work done on them aboard the mothership was considered as processing, and the higher rate was always assessed.

<sup>2/</sup> The Agricultural Bank of Greece can loan money to fishermen at an interest rate of 11 percent, but a merchant is not eligible for such loans, and must borrow from the Bank of Greece at an interest rate of around 25 percent.



It was at this time that a large number of the Greek boats changed their plans, and instead of fishing in the North African waters, where they would have to land their entire catch, they went to the Egyptian waters where, until then, they had been required to land only half their catch. The Egyptians in 1946 required Greek boats fishing in their waters to land their entire catch but waited to enforce this requirement until after the Greeks had completed their sponge fishing season.

Tripoli did not allow Greek fishing in its waters until 1948, and it is reported that not more than 50 Greek boats arrived there then. Fees for licenses varied according to the type of boat. The harvest had to be landed at Tripoli, and an export tax of 1 percent was based on the fiction that formal importation had occurred. Naturally, the Greek sponge fishermen resent having to pay such fees for the privilege of fishing in waters that were, as they say, "traditionally free" to them, and they are most eager to have the final disposition of these colonies settled in order that they may more effectively press for recognition of their "rights," and have such rights as they may be granted protected by treaties.



ELEPHANT'S EAR SPONGE FROM THE MEDITERRANEAN SEA.

Beginning a few years prior to World War II, and continuing after the end of hostilities, the Greek sponge fishermen have been meeting with more and more opposition to their fishing sponges in Egyptian waters, because prior to World War II, the Egyptians began serious plans to exploit (but unsuccessfully) their own sponge beds and to enter on their own account the sponge fishing market.

The Egyptian agreement with the Greek fishermen for the 1949 fishing season provided that (1) boats carrying diving equipment and those operated with motors were required to pay \$11,358 each for licenses (the money loaned to them by the Greek government); (2) Egyptian boats were allowed to accompany the Greek fishing boats, but no observers were permitted aboard the Greek vessels; and (3) the catch was to be landed for 30 days on Egyptian soil.

However, no sponges were bought by Egyptians during the 30-day period (the agreement being that boat captains had to approve the selling prices, and these were approved at the Greek mainland rather than the Egyptian prices). The entire catch was later brought home for export by Greek merchants.

Cooperatives: There are only about three important sponge fishing cooperatives in Greece; one with headquarters in Piraeus; one with headquarters on the Island of Hydra; and the third on Kalymnos Island. The cooperatives are understood to maintain treasuries from which members may borrow money, and to provide other protective services for their participants.

Reserve Insurance Fund for Sponge Fisheries: To take care of boat operators, divers, and others who are not members of a sponge fishing cooperative, a Reserve

Insurance Fund was set up in 1949. While the provisions of this agreement may appear to be a little heavy on the borrower (particularly since the interest rate on loans from the Bank are around 16 percent), it has its advantage in that a sponge fisherman with no collateral may obtain a needed loan from a reliable source, at a rate not considered exorbitant as compared with interest rates charged by private money lenders in Greece.

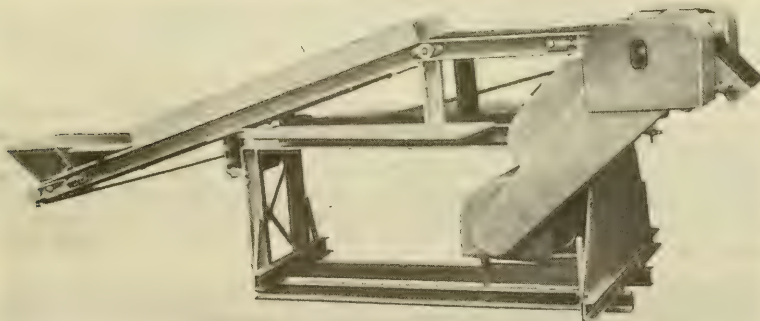
Preparing Sponges Aboard the Mothership: Diver's boats are usually caiques, and a "mothership" is usually assigned to small groups of such fishing boats. The mothership, with a crew of sailors and workmen and a captain, provides food and sleeping quarters for the divers, and skins, washes, and stores the sponges as they are brought aboard. On board this mothership, the sponges are trod upon by feet, causing the black, shiny cover of the sponge to be pressed away and the white, milky substance in the sponge to be exuded. The sponges are then strung on wires or ropes and allowed to trail in the water overnight to clean them. They are then dried in the sun and pressed into bags for storing on the mothership until port is reached.

While this is a part of the processing, it is still far, in some cases, from a finished job. On shore sponges must be rid of stones, broken shell, and other foreign matter that have accumulated in them; they must be trimmed and sorted; some must be bleached, etc.



## Iceland

USES GERMAN SKINNING MACHINE: At present Iceland is using one skinning machine, of German manufacture, for processing fish fillets, an April 18 American consular dispatch from Reykjavik reports.

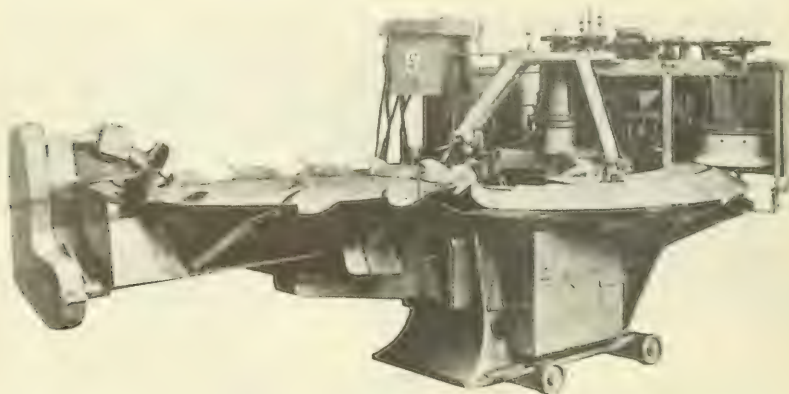


TYPE OF GERMAN FISH-SKINNING MACHINE BEING USED IN ICELAND.

The skinning machine, installed in a quick-freezing plant in Hafnarfjörður, has been employed with considerable success. Compared to hand skinning, reports indicate that it skins fillets well, operates faster and more efficiently, and recovers more fish. The machine performs the work of at least five fillet skimmers. Since it will prove to be a great savings to the industry if employed

on a large scale in the country's major quick-freezing plants. Iceland plans to rent several of these units from Germany.

USES GERMAN FILLETING MACHINE: Iceland is now leasing and using one filleting machine which was invented and constructed by Rud Baader, owner and manager of the Nordischer Maschinenbau, Lubeck, Germany.



TYPE OF GERMAN FISH-FILLETING MACHINE BEING USED IN ICELAND.

As described by the Icelandic Director of State Inspection of Fish, this fish-filleting machine is round, approximately  $6\frac{1}{2}$  feet in diameter. About 20 fish per minute are filleted, which is sufficient for any freezing plant in Iceland.

In a comparison between machine-filleted and hand-filleted fillets, it was found that the machine recovered three percent more fish than hand filleting. Only two men are required to operate the filleting and decapitating machines, which are leased by the manufacturer.

When the machine is in operation, the fish moves horizontally, approximately in a half circle. On the side of the filleting machine is attached a companion machine which cuts off the head of the fish and delivers the fish into the filleting machine. When the fish enters the filleting machine, the size of the fish is automatically measured, and the knives are automatically adjusted according to the size of the fish. The filleting machine cuts the fillets and delivers them directly to another machine, which strips the skin from the fish if they are to be packed without the skin.

The filleting machine has not met with any success primarily because Icelandic fish are large in size and certain major adjustments in the equipment are required.





## India

MANUFACTURE OF SHARK-LIVER OIL: In order to popularize shark-liver oil manufactured by the Government of Madras oil factory at Kozhikode (Calicut), the manufacture of capsules is proposed. It is understood a capsule-making plant for this purpose will be erected at Kozhikode, according to a March 1 American consular report from Madras. The conversion of the oil into capsules is said to have a double benefit--removing the existing fish odor and making it easier to take.

Meanwhile, a fairly large quantity of high-potency oil was sent by the Government to England to be "pressed" into capsules, which will be sent back to India. The Government plans to make an initial distribution of 100,000 English-made capsules.



## Jamaica

STATUS OF THE FISHERIES: Plans to Develop Fisheries: In its endeavor to produce more food from the sea, the Government of Jamaica in 1949 introduced a scheme for the development of fisheries. The scheme was devised on the basis of various surveys of the fishing potentialities of the Island, states the American Consulate General at Kingston in a March 31 report.

The scheme, set out in two parts, falls under the headings of the establishment of the Fisheries Division of the Forestry Department and the carrying out of fisheries research. Two separate applications were to be made to the Secretary of State for the Colonies for assistance from Colonial Development and Welfare for the two-part scheme.

The first will be for a grant of \$47,662 to be spread over a period of six years and four months dating from December 1, 1949, at which time the scheme came into effect. This grant was to be used for the setting up of the Fisheries Division, the appointment of a Fisheries Officer, his necessary training abroad, and the transfer during 1950 of the functions performed by the Angling Association of Jamaica on the Government's behalf.

The second application was for a grant from the Central Research Allocation under the Colonial Development and Welfare Acts to meet the cost of experiments in fish culture and in the use of fish fences in marine waters. The sum of the Government's contribution to the scheme was placed at \$16,800. It was proposed that the first fish farm, along experimental lines, should be a 40-acre plot at Twickenham Park.

Government investigations disclosed that while there is no big business in marine fishing, the stocking of swamp land with fish would introduce into Jamaica a local industry that would provide much employment and ease the Island of its enormous expenditure for the importation of foodstuffs. The proper stocking of such swamps would produce fish in greater number and size than the open sea. Problems of preservation and distribution would be considerably lessened by the introduction of modern facilities throughout the Island, especially if the farms were distributed in several areas.

Marine Fisheries: Jamaica is surrounded by a coastal shelf which stretches out to about 100 fathoms and then drops off suddenly to great depths. In the terminology of the local fishermen, the hundred-fathom line where the depth increases suddenly is called "The Edge" or "The Drop." From the east end of Kingston Harbor up to Pedro Great Bay, the south-east coast has a wide shelf often extending out twenty miles from the shore. Fishing in Jamaica has been confined to this shelf and to the "blue water" immediately beyond the "Edge."

The Pedro and Morant Bays are the largest fishing banks. They are half the size of Jamaica and are situated about 40 to 100 miles south of Jamaica. There are important marine fishing centers elsewhere and a multitude of small fishing beaches. The main types of fish caught are king, jack, cross bar, grunts, parrot, bonito, butterfish, groupers, and snappers.

The craft used for fishing consist almost entirely of wooden canoes, some small and some large.

There is a limited amount of shark and turtle fishing, the former for livers and meat, and the latter for turtle steaks and turtle soup.

A limited liability company, which was recently established, has been undertaking a reasonable amount of deep-sea fishing. A Diesel-engined vessel is used for the purpose. This service has added substantially to the fresh fish supply at Kingston and other Jamaican markets.

Fresh-water Fishery: The fresh waters of Jamaica do not provide much food fish. "Mudfish" and "crayfish" (shrimp) are caught in small quantities.

There is practically no pond fish culture at present.

NOTE: Values converted on the basis of one Jamaican pound equals U. S. \$2.80.



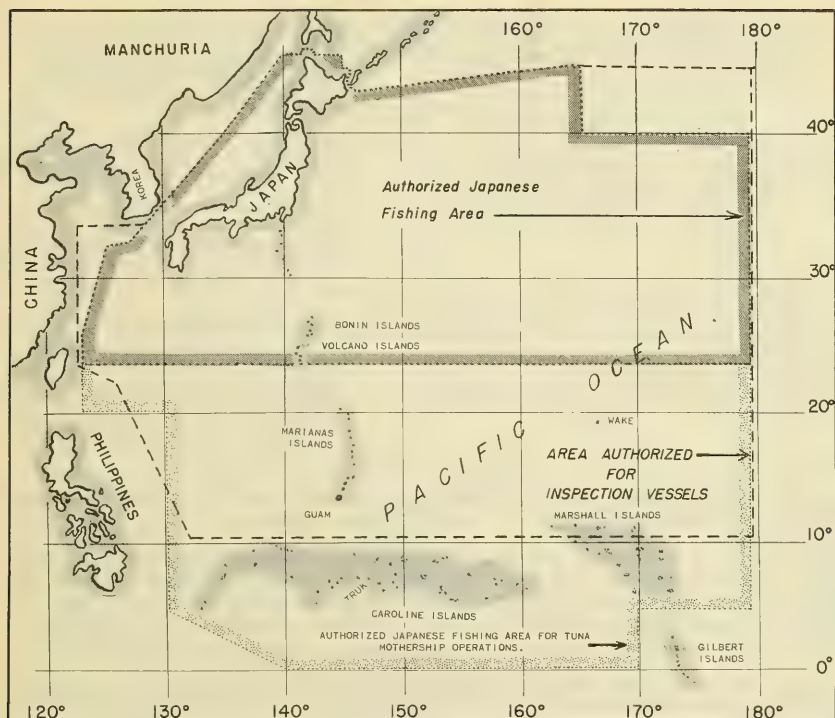
## Japan

### AUTHORIZED JAPANESE FISHING AREA EXTENDED FOR TUNA MOTHERSHIP OPERATIONS:

Authorization for the operation of only mothership-type tuna fishing (similar to the Antarctic whaling expeditions) in the area extending south from the authorized Japanese fishing area to the equator was granted by the Supreme Commander for the Allied Powers by SCAPIN 2097 dated May 11, 1950. This will include waters in the United States Trust Territory around the Caroline Islands, the Marianas and the Marshall Islands, but not the Gilbert Islands.

The following is the full text of the Memorandum:

1. Authorization is hereby granted for the operation of mothership-type tuna fishing expeditions in the area extending south from the authorized fishing area and bounded by a line extending from 24° N. latitude, 180° longitude, south to 5° N. latitude; thence west to 5° N. latitude, 170° E. longitude; thence south to the Equator; thence west to 140° E. longitude; thence northwesterly to 5° N. latitude, 130° E. longitude; thence north to 20° N. latitude; thence west to 123° E. longitude; thence N. to 24° N. latitude, 123° E. longitude.
2. The expeditions authorized in paragraph 1 above will operate under the following conditions:
  - a. No vessel of the expedition will approach closer than three (3) miles to any land not under the administrative control of the Japanese



THE HORIZONTALLY-LINED STIPPLED BORDER INDICATES THE EXTENT OF THE AUTHORIZED JAPANESE FISHING AREA. THE BROKEN BLACK LINE INDICATES THE AREA AUTHORIZED FOR JAPANESE INSPECTION VESSELS. THE DOTTED STIPPLED BORDER INDICATES THE EXTENSION OF THE JAPANESE FISHING AREA SOUTHWARD FOR JAPANESE TUNA MOTHERSHIP OPERATIONS.

#### Government.

b. Each participating vessel will be marked and operated in conformity with directives from the Administrator, U. S. Naval Shipping Control Authority for Japanese Merchant Marine.

c. The master of each participating mothership will forward a daily radiogram to the Fisheries Agency, Tokyo, containing the position of his ship at 1200 hours local time on the day the radiogram is dispatched.

d. The master of each participating catcher boat will, while in the fish-

ing area authorized in paragraph 1 above, report daily to the mothership of his fleet the position of his ship at 1200 hours local time.

e. The master of each participating catcher boat will, during fishing operations, maintain a navigation and fishing log showing daily catch by number of fish and species, location of catch, type and amount of gear used, number of sets, and other data of fishing and navigational nature which may be specified by the High Commissioner for the Trust Territories of the Pacific Islands. Within thirty days after the return



of the expedition to Japan, the Japanese Government will submit copies of these logs in the English language to General Headquarters, Supreme Commander for the Allied Powers.

f. The Japanese Government will assign two inspectors to each fleet to insure compliance with the provisions of this Memorandum and other applicable Memoranda from General Headquarters, Supreme Commander for the Allied Powers, and applicable laws of the Trust Territories.

3. Representatives of the High Commissioner for the Trust Territories of the Pacific Islands, who will be agents of the Supreme Commander for the Allied Powers, may periodically board vessels of the expedition to conduct inspections within his area of responsibility. These representatives will be given all possible assistance and accommodation.
4. A representative of the Supreme Commander

for the Allied Powers will accompany each fleet to insure compliance with the provisions of this Memorandum and other applicable Memoranda and instructions from General Headquarters, Supreme Commander for the Allied Powers.

5. Direct radio communications between the motherships of the expedition and Japanese coastal radio stations is authorized.
6. Direct communication between Natural Resources Section, General Headquarters, Supreme Commander for the Allied Powers and the Ministry of Agriculture and Forestry, concerning matters within the scope of this memorandum is authorized.
7. The Japanese Government will submit a report to General Headquarters, Supreme Commander for the Allied Powers, by June 1, 1950, containing the names and gross tonnage of all vessels which will participate in the expedition, and full details of operation and methods of compilation of statistics.

The announcement of the authorization of Japanese mothership-type tuna fishing into the area extending from the present authorized area south to the Equator was greeted by the Japanese press and officials as an important contribution to Japan's economic recovery, according to a May 19 American Embassy dispatch from Tokyo which reported on press comments. The press comments pointed out that Japan's most fruitful prewar fisheries in the north are still off-limits. The Japanese newspaper Asahi of May 14 declared: "We hope the Allies will make the northern fishing grounds available to the Japanese as early as possible."

According to SCAP's Public Information Office, the authorization is recognition of Japan's constructive efforts to promote the continued productivity of aquatic resources. It was described as a marked contribution to Japan's economic recovery program.

\* \* \* \* \*

MOTHERSHIP OPERATIONS FOR TUNA: Two experimental operations have been conducted from Japan, especially for tuna, using so-called motherships with catcher boats, according to the April 8 Weekly Summary of SCAP's Natural Resources Section.

The first tests were carried out by the Taiyo Fishing Company in the summer of 1948; the second, by the Nippon Suisan Company in the winter and spring of 1949. The purpose of both experiments was to determine the economic feasibility of using a mothership and several catcher boats in tuna fishing. It was thought that this method might result in an improvement in the freshness of the fish due to rapid refrigeration and in a corresponding increase in the quantity of marketable fish.

The Taiyo Fishing Company conducted its experiment from July 24, 1948, through August 28, 1948, off the Bonin Islands in an area between 24° N. latitude and 26° N. latitude and 144° E. longitude and 153°25' E. longitude. The fleet consisted of the refrigeration ship Banshu Maru (983 gross metric tons, 800 h.p.), and three

Table 1 - Catch Record of Taiyo Fishing Company  
Mothership Operation for Tuna

Species	Number of Fish	Weight	
		Total	Av. Per Fish
		lbs.	lbs.
Tunas:			
Albacore .....	912	52,457	56.9
Yellowfin .....	248	20,819	83.9
Big-eyed .....	124	12,150	97.9
Miscellaneous ..	294 (est.)	8,186	27.8
Black marlin .....	783	116,626	148.9
Sharks .....	1,059	114,038	107.6
Shark livers .....	-	5,329	-
Tuna livers .....	-	599	-
Total .....	3,420	330,204	-

1/ This catch was converted into approximately 303,455 pounds of refrigerated products.

24°01' N. latitude and 27°51' N. latitude and 143°13' E. longitude and 154°50' E. longitude. Although the fleet was similar to that operated by the Taiyo Fishing Company, consisting of the refrigeration ship Kaiko Maru (2,994 gross metric tons, 1,100 h.p.), and three catcher boats averaging 100 gross tons and 210 h.p., the tuna-fishing operation was carried on incidental to the company's regular whaling operations, therefore, it was not a mothership operation in the true sense. The catcher boats were actually engaged in fishing a total of fifty days.

Neither company's experiment was a commercial success. There were four main reasons for this:

1. The catch was considered poor in relation to the cost of the operation.
2. Adverse weather conditions interfered with the transfer of fish from the catcher boats to the motherships.
3. Heavy seas on the fishing grounds made operations difficult.
4. The lack of adequate refrigeration aboard the catcher boats made it impossible to keep the fish in prime condition until they could be transferred to the motherships.

tuna long-line catcher boats each of 135 gross tons and 200 h.p. The Banshu Maru had a refrigeration capacity of 40 metric tons daily and a fish-carrying capacity of 500 tons. The catcher boats were actually engaged in fishing thirty days.

The Nippon Suisan Company's experiment took place from February 27, 1949, through May 30, 1949, off the Bonin Islands in the area between

Table 2 - Catch Record of Nippon Suisan Company  
Mothership Operation for Tuna

Species	Number of Fish	Weight
		lbs.
Tunas:		
Yellowfin .....	238	15,545
Big-eyed .....	36	3,454
Albacore .....	780	37,028
Skipjack .....	24	511
Total tunas ....	1,078	56,538
Spearfishes:		
Black marlin .....	1,138	131,377
Striped " .....	561	29,696
Broadbill .....	18	2,877
Sailfish .....	328	10,456
Total spearfishes	2,045	174,406
Miscellaneous:		
Spanish mackerel ..	262	7,158
Dolphin .....	286	70,791
Shark .....	1,705	146,179
Wahoo .....	6	171
Total misc. ....	2,259	224,299
Grand Total .....	5,382	455,243

TUNA LANDINGS, 1949: It is estimated that about 51,000 metric tons of tuna were landed in Japan during 1949. Not all prefectures have reported their 1949 landings, therefore, this total is subject to change.

The tuna landings consisted of skipjack, 40,000 metric tons; albacore, 8,000; yellowfin, 2,000; and bluefin, 1,000. From this tuna, 173,058 cases of tuna were packed and exported (about 92,000 cases were light meat and about 81,000 cases were white meat). An estimated 80 percent of the exported tuna was sold to United States buyers. In addition, about 1,500 metric tons of tuna were frozen for export to the United States.

Japan expects to export about 500,000 cases of 48 half-pound cans of tuna and about 2,900 tons of frozen tuna during 1950.

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FISHERIES PRODUCTION, 1949: Over-all fisheries production in Japan during 1949 was reported to have reached 3.1 million metric tons, according to an April 15 American consular dispatch from Tokyo. This was almost twice the 1945 production and is indicated to be almost the maximum production practicable within Japan's existing fishing area.

This increased production permitted the removal of price and distribution controls over all types of fish on April 1, according to a Government announcement.



TYPE OF LARGE JAPANESE DIESEL TRAWLER.

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JAPAN TO REDUCE EAST CHINA SEA TRAWLING FLEET: Under the Law for the Prevention of Exhaustion of Marine Resources, enacted by the Diet on May 1, 1950, the Japanese Government has announced its intention to cancel the licenses for approximately 7 large otter trawlers and 240 medium otter trawlers operating west of 130° E. by June 30, 1950; and the licenses for approximately 4 large otter trawlers and 39 medium otter trawlers operating west of 130° E. by December 31, 1950.

The new legislation grants the Minister of Agriculture and Forestry the authority to reduce the number of fishing boats to prevent exhaustion of a certain fishery after public hearings have been held and the Central Fisheries Adjustment Council has voiced its opinion on the proposed reduction. The Law also requires the Government to give financial compensation to the owners of vessels eliminated from the fishery, according to the May 6 Weekly Summary of the Natural Resources Section of SCAP.

\* \* \* \* \*

ROLE OF AQUATIC PRODUCTION IN FOOD AND ECONOMIC LIFE OF JAPAN: Aquatic production plays a larger part in the food and economic life of Japan than in that of any other major nation, reports the April 22 Weekly Summary of SCAP's Natural Resources Section. About 90 percent of the animal proteins in the Japanese diet are supplied by fisheries production. Before the war aquatic products were major items in Japanese exports, the most valuable being canned crab meat and canned salmon. Such products as agar agar and dried fish of various kinds were important also.

In the years before World War II (1935-39), most of Japan's production (4,214,000 metric tons) came from the coastal waters of the four main islands. Since the surrender, Japan's fishing activities have been limited to the area authorized by the Supreme Commander for the Allied Powers. In prewar years, this area supplied about 85 percent of Japan's catch; nine percent came from north of the present area and six percent from southern waters and the East China and Yellow seas. In 1949, Japanese production reached about 3,113,000 metric tons. Production of miscellaneous species, excluding sardines and herring, was about 173,000 metric tons greater than before the war, while production of sardines and herring was about 634,000 tons less, primarily as a result of the scarcity of these fish in Japanese coastal waters.

Japanese requirements for aquatic products cannot be determined precisely because such requirements depend to a large extent on the price of these products compared to the price of other foods and materials. Late in 1949 and early in 1950, production reached a level which satisfied most requirements at price levels set by government controls. This was demonstrated when market prices of most fish dropped to or below the official prices. However, if price decreases continue, the amount which will be used for food can be increased considerably, and it will again become practical to convert the cheaper grades of fish into meal for livestock feed and fertilizer and to oil for various commercial purposes. The amount required for these purposes is relatively unlimited if the price is sufficiently low.

Requirements of aquatic products for export also are impossible to specify with any precision in that they depend on foreign markets and the price at which Japan can process them for export. Through better handling and preservation facilities, a much larger proportion of tuna, albacore, and sardines can be made available for canning so that the pack can be increased greatly. Production of

canned crab meat will remain limited to about the present level, unless additional areas to the north are opened to Japanese fishing. Canned salmon will be limited to pink or chum salmon unless northern areas are opened, because no red salmon comes from Japan. Agar agar, as well as other seaweed products, now is available in greater quantities than are being taken by the export market. The quantities of other canned products can be increased should the market justify it.

The possibility for increased aquatic production generally has been greatly overestimated by the Japanese, unless sources of supply or fishing methods not now known are discovered. The present fishing area is being exploited almost to the maximum so that, except for sardines and herring, little over-all increase can be expected except through further development and implementation of conservation and management programs. Extension of the fishing area to the north and restoration of Japanese fishing there to the prewar level would increase production about 370,000 metric tons. Extension to the south at the prewar rate of exploitation would produce only 25,000-50,000 metric tons, but present information indicates that this might be expanded considerably. Extension on the west might add 25,000-50,000 metric tons annually to the catch but it is questionable whether this could be done without overfishing the area. Return of sardines and herring to their prewar abundance would make it possible to increase the catch another 630,000 metric tons.

The over-all expectation is that in the immediate future Japan will be relatively independent in the field of aquatic products. Imports will be limited to luxury or semi-luxury products such as laver and possibly "tai" (sea bream) and dried shrimp, while exports will be principally swordfish, tuna, agar agar, shark fins, dried seaweed, sardines, crab meat, salmon, and vitamin oil.

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STATUS OF FISHERIES TECHNOLOGY: The following information on general conditions in the fish canning and refrigeration industries in Japan was prepared for the Scientific and Technical Division of SCAP's Economic and Scientific Section and was summarized in the Weekly Summary of April 8:

1. The level of technology in the fish canning and refrigeration industries is low compared to that reported in the United States. No improvements have been made in basic processes for about the past 20 years. Equipment in use in the refrigeration industry is generally obsolete. The canning industry, being a later innovation in Japan, has more modern equipment. At present there is a need for the importation of equipment for the refrigeration industry in particular.
2. Some canneries are well designed, but generally the organization is poor and is a detriment to the attainment of high production levels. An excessive amount of hand labor is used in the canning industry in comparison to United States practices. Refrigeration plants are poorly designed, and practical changes are needed in order to speed up the flow of fish through the plants.
3. Plant inspection and control practices are inadequate in most cases. Central laboratories are practically non-

existent. Equipment salvage and housekeeping practices are poor compared to United States standards; but do not affect production to an appreciable extent. Safety practices, such as enclosed gears and belting, are wholly inadequate.

4. Canned fish and frozen products intended for export are excellent in regard to appearance. More attention is paid to the appearance of the products than to quality and flavor. Frozen products for domestic use were usually of low grade when distribution and price controls were in effect, since the incentive to improve the quality was lacking. Byproduct extraction and utilization are high.
5. Production engineers are employed in nearly all plants but are not so effective as they might be owing to lack of knowledge of advanced methods employed in these industries in other countries.
6. Because of the lack of knowledge of modern designing and technological improvements, Japanese operators of the canning and refrigeration industries are doing very little to effect improvement. Nearly all of the new plants constructed are of identical design in building and equipment to those already in operation. Experiments are being made in the improvement of design of refrigerated rail cars for the transportation of fish from distant areas to large consuming areas. Investigation is being made to design and equip refrigerated trucks for local distribution of fish.
7. Advice and recommendations are given by representatives of the Supreme Commander for the Allied Powers in order to improve techniques. The Japanese Government is encouraging the formulation of plans to improve techniques and facilities in the refrigeration industry.
8. Techniques in the fishing industry could be improved by:
  - a. Making available more technological publications.
  - b. Redesigning the existing refrigeration plants and equipment.
  - c. Sending technical personnel abroad to study modern methods and design.
  - d. Establishing adequate plant inspection and control practices.
  - e. Making available the findings and programs of technical research laboratories in other countries and coordinating and disseminating the work of Japanese scientists.
  - f. Establishing adequate control laboratories.
  - g. Importing more modern equipment.



JAPANESE FISHERIES LEADERS VISIT UNITED STATES: Two Japanese fisheries leaders are visiting the United States for three months to observe and study administration and research related to the conservation and management of resources. Japanese research is being reoriented along these lines in accordance with advice and guidance from personnel of General Headquarters, Supreme Commander for the Allied Powers, according to its April 15 Weekly Summary.

The two Japanese specialists now touring the United States, Masao Sogawa and Hiroshi Kasahara, will discuss with American researchers and leaders of the fishing industry the various phases of fisheries research, administration, and enforcement. Their visit is part of a program authorized by SCAP to permit Japanese leaders to obtain first-hand knowledge of United States institutions and administration which can be applied in rebuilding Japan into a democratic nation.

Masao Sogawa is Chief of the Production Department of the Fisheries Agency. He is studying the organization and procedures of national and state fishery departments for law enforcement and prevention of overexploitation or overfishing of resources.

Hiroshi Kasahara is a fishery biologist and statistician. The purpose of his visit is to become acquainted with the methods used in collection and analysis of fisheries statistics on production and biology. He is especially interested in those phases of research dealing with fish population studies, determination of depletion of fisheries stocks, and the application of effective conservation measures.

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OPENING OF JAPANESE OVERSEAS AGENCIES ANNOUNCED: Japanese Government officials arrived in the United States the first week in May to open agencies in five key American cities for the purpose of promoting trade between the United States and Japan and the handling of citizenship and property problems relating to Japanese residing in the United States. The agencies will be located in New York, San Francisco, Los Angeles, Seattle, and Honolulu, the United States Department of State announced on May 1.

The United States Government two months previous, after consulting with other Far Eastern Commission countries, transmitted through General MacArthur's Headquarters an invitation to the Japanese Government to establish agencies in this country--an invitation which was approved by General MacArthur and accepted by the Japanese Government. The main objectives behind the invitation to establish the agencies were to provide means for making information available to American businessmen on trade opportunities in Japan and on Japanese laws and regulations concerning import-export trade, as well as to permit Japan, which is unusually dependent on overseas trade, to conduct research on market conditions and trade opportunities in the United States. It is believed that the latter function will tend to eliminate instances of underpricing of Japanese exports by giving the Japanese Government and Japanese businessmen a better understanding of United States and world market conditions.

JAPANESE GOVERNMENT



## Korea

MARINE LANDINGS, 1949: Total marine landings for the Republic of Korea (South Korea) in 1949 amounted to 300,391 metric tons, compared to 286,592 tons in 1948 and 301,952 tons in 1947, according to an April 3 Seoul joint dispatch from the Department of State and ECA. Of the total marine landings, fish production totaled 246,951 tons; shellfish, 7,319 tons; sea weed, 9,104 tons; and sea animals (spiny lobsters, crabs and whales), 37,017 tons.

Republic of Korea Marine Landings, 1946-49				
Type	19491/	1948	1947	1946
	..... (in metric tons) .....			
Fish .....	246,951	225,917	264,281	236,748
Shellfish ..	7,319	6,423	5,336	21,318
Sea weed ...	9,104	7,812	7,683	24,541
Sea animal .	37,017	46,440	24,652	23,441
Total ..	300,391	286,592	301,952	306,048
1/November and December data included in this total are preliminary.				

Outlook: No major increases in the fish catch are currently anticipated mainly due to a decline

in the number of boats in the fishing fleet. Unless additional boats are forthcoming, it is expected that the fish catch will decline. Fishermen are unable to finance the cost of construction of new boats and equipment under present circumstances. For this reason, the Economic Cooperation Administration Mission has programmed \$2,000,000 during fiscal year 1951 for the purchase of new fishing vessels (also see p. 15 of this issue). It is also currently planned that all fishery supplies on hand, many of which have been in storage more than six months due to financing difficulties, will be sold directly to the various fishery guilds and associations.



## Norway

NORWEGIANS URGED TO SEEK MARKETS FOR FISHERY PRODUCTS IN THE UNITED STATES:

Through a press interview with the former Norwegian Commercial Attache at San Francisco, Norwegian exporters were again urged to spend more time on the attainment of an intelligent comprehension of the American market. The former attache pointed out that where products had been adapted to American demand and taste, marketing had been quite successful. He stated that there were good opportunities for increasing frozen fish sales in the United States, but called attention to the necessity of transporting frozen products on ships with deep-freeze compartments.

It is also reported that the Norwegian Government has urged the canning industry to unite and seek markets in the United States under one trade name and one jointly-sponsored advertising campaign. Large factories with established markets were accused of refusing to cooperate with smaller factories which seek to enter American markets.

The problem of packing Norwegian export sardines in olive oil instead of herring oil, with a resulting increase in price to the consumer, was the subject of a lively press debate with, however, no conclusive results, reports a May 3 American consular dispatch from Oslo.

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ALBUMEN FROM FISH AND FISH WASTE: Norwegian chemists have discovered a satisfactory method of producing albumin (egg white) from fish and fish waste, according to a May 20 report from the Norwegian Information Service.

Before World War II, the Germans were producing a similar product, but it was not sufficiently pure to compete in the world market with albumin produced from milk, peanuts, coconuts, soy beans, etc. The German product tasted and smelled too much of fish.

The pure Norwegian product now achieved is the result of cooperation between two firms—E. O. Collett & Co. of Oslo, and Astrup & Co. of Kristiansund. Trial production has been started at the rate of some 600 pounds of dried albumin a day, equal to the egg white contained in the daily output of eggs by 100,000 chickens. The production of one pound of this dried albumin in the form of a dry white powder requires 10 to 12 pounds of fish waste (mostly cod). Production is carried out by a completely chemical-mechanical process.

One gram (about one-thirtieth of an ounce) of this powder is sufficient to produce three to four pints of meringue ("cream") which whips and mixes easily. In several respects, the artificial product is claimed to be better than natural egg white, and one pound of it is equivalent to that contained in about 150 chickens eggs.

This product contains 80 to 90 percent pure protein and can be used in baking, in the manufacture of ice cream, puddings, cheese, soup powder, mayonnaise, pharmaceutical products; in paints and varnishes; in the textile industry; as well as in paper, cosmetics, and soap. A price of about \$2.50 per pound is indicated for the best quality product. For industrial use, a less refined product would be needed and the price would be correspondingly lower.

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FLOATING HERRING OIL AND MEAL FACTORY A SUCCESS: The first Norwegian floating herring oil and meal factory, which went into operation in January this year, has been a great success according to all reports. The factory has a capacity of some 370 metric tons of herring per each 24-hour period, and 85 men are employed in the factory part of the vessel, states an April 4 American consular dispatch from Oslo.



LOFOTEN ISLES, NORWAY.

LOFOTEN COD CATCH POOR: The Norwegian Lofoten cod catch is expected to be even poorer this year than last. As of March 13 it totaled 11,500 metric tons compared to 17,800 tons for the same period last year.

The small catch caused considerable speculation in fish prices, with producers of salted fish outbidding producers of dried and frozen fish. A ceiling price of 3 cents per pound was imposed. Fish processors agreed to adhere to this price in their purchases.



The Ministry of Fisheries, given authority to formulate regulations on the production and marketing of cod in the Lofoten district, prohibited the salting of cod there at the end of March. However, it is anticipated that some freezing plants may be forced to suspend operations in the middle of what is normally their most busy season.

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PURSE-SEINING FOR COD TRIED: Purse-net fishing was tried this season in the Norwegian Lofoten cod fisheries for the first time on a small scale, reports the Norwegian Information Service. The production for the season, which ended the week of April 22, amounted to 71,839 metric tons, and purse-net fishing accounted for 12 percent of this total. This, according to the Norwegians, proves the superiority of purse-net fishing for cod. The largest catch in one day by this method was over 1,000 metric tons.

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NORWAY PLANS TO DEMONSTRATE FISHING METHODS TO FOREIGN COUNTRIES: It is reported that western Norway's Boatbuilders Association plans to send a fishing vessel completely equipped with trawl nets and lines to demonstrate fishing methods to foreign countries in an attempt to stimulate interest in Norwegian wooden vessels.

The Norwegian shipbuilding industry appears to be in a rather serious situation, reports an April 4 American consular dispatch from Oslo. Only one-half of the shipyards for wooden vessels are operating at the present time and they are employing an average of 6 to 7 men each as compared to the usual average of 20 men.

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NORWEGIAN ANTARCTIC FLOATING WHALE CANNERY: The 20,000-ton Norwegian tanker Kosmos V returned to Sandefjord after a very successful experiment as a floating whale cannery, according to the May 6 report from the Norwegian Information Service. No less than 160,000 cans of meat cakes and 40,000 cans of liver paste were canned at sea from freshly-caught whales. The whole of this amount was canned in 24 working days.

The whale meat had to be transported to the Kosmos V from other factory ships. Bad weather sometimes held up supplies. Because of the limitation imposed by the Norwegian Government on the number of whale refinery ships, Kosmos V was not allowed to act as a processing ship for the whales caught by catcher boats. It was dependent on other expeditions for the supply of meat. Experts are of the opinion that in the future canning plants should be installed on the actual refinery ships.



## Republic of the Philippines

UNITED STATES VESSEL TRANSFERRED TO PHILIPPINE BUREAU OF FISHERIES: The David Starr Jordan, a research and exploratory vessel of the Philippine Fishery Program of the United States Fish and Wildlife Service, was transferred to the Philippine Bureau of Fisheries on May 2, 1950. The vessel was accepted by the Acting Director of the Philippine Bureau. This vessel, which was acquired outright by the United States Mission, represents a monetary value of ₱82,000 (approximately \$41,000) and is equipped with a wide variety of equipment.

The vessel is one of a fleet of three vessels that have been exploring Philippine waters for the past two-and-half years in conjunction with the Philippine rehabilitation program of expanding the Philippine fisheries.

It is 50-ft. long over-all, has a gross tonnage of 30 tons, is powered with a 125 h.p. Diesel engine, and has had mechanical refrigeration installed in the Philippines.

This vessel has been used by the Mission for research and exploration. There is a definite need for the continuation of these functions by the Philippine Bureau of Fisheries if the fishing industry of the country is to keep abreast of the development of the Philippines.

UNITED STATES FISHERY MISSION PLANS DEPARTURE FROM THE PHILIPPINES: Prior to the final closing of the Philippine Fishery Program of the U. S. Fish and Wildlife Service and the return of the personnel to the United States, the Mission is closing its office and laboratory, according to a May 15 announcement by the Administrator of the Program. The Program has been operating in the Philippine Republic for the past three years under the authority of the United States Philippine Rehabilitation Act of 1946.

The administrative office will remain open until June 20 for the final settlement of affairs. Disposition of property and effects of the program have been going on for the past month. Approximately \$300,000 worth of scientific equipment, fishing gear, and other paraphernalia has been transferred to the Philippine Bureau of Fisheries in accordance with the law.

The Theodore N. Gill, one of the Program's three exploratory and research vessels, departed for the United States May 5. The David Starr Jordan, another of the exploratory vessels, was transferred to the Philippine Bureau of Fisheries for its use. The Spencer F. Baird, the flagship of the rehabilitation fleet, returned to the United States on January 10.



## Union of South Africa

MARINE RESEARCH PROGRAM: For at least the next two years the South African Division of Fisheries will use the Africana II, a new research vessel completed in January this year, and the two smaller vessels, Schipa and Palinurus, for intensive investigations into the pilchard resources off the west coast of Africa, according to the March 1950 issue of The South African Shipping News and Fishing Industry Review.

In the past seven years pilchards have become the most important fish in South African waters and over \$11,200,000 is now invested in the pilchard processing industry.

Since the industry started, scientists have been aware of the urgent need for pilchard research. The Division has now drawn up a comprehensive program covering an area of 710 sq. miles of sea centered on St. Helena Bay.

Twice a month the Africana II will sail a "N"-shaped course, starting out to sea and finishing inshore. A network of stations has been marked out along this course and the ship will stop at each of them to observe weather conditions, take water temperatures and samples from varying depths, and make plankton hauls.

While the Africana II is working out to sea, the two smaller patrol boats will operate inshore along St. Helena Bay, taking fish samples from the nets of commercial fishing boats, making plankton hauls in the immediate vicinity of a shoal, observing weather conditions, and taking water temperatures. Two officers, one at Lamberts Bay and one at Stompneus Bay, will collect and examine the samples from the boats and, in addition, will twice weekly take 50 fish from five different commercial boats and record the weight of each fish, its length, sex, condition of sexual organs, and will examine and record its stomach contents.

From the data collected it is hoped to assess the potentialities of the fishery, discover where the pilchards spawn and die, why they concentrate in certain areas, and where they can best be fished.

The new vessel, Africana II, was launched in October 1949. It is a steam trawler with 1,300 h.p. triple-expansion reciprocating engines, an over-all length of 206 ft., a breadth of 33 ft., a depth of 16.2 ft., and a sailing range of 25 days. It is 882 gross registered metric tons and will carry a complement of 10 officers, 4 scientists, and a crew of 21 men.



## U. S. S. R.

ENFORCEMENT OF TWELVE-MILE ZONE OFF THE BALTIC COAST: A de-facto 12-mile zone off the Polish- and Soviet-occupied German Baltic coast has been created by Soviet Russia, according to Bremen newspaper reports. Soviet naval units in large numbers are patrolling the Baltic Sea, and no week passes without the capture of fishing trawlers (regardless of nationality) that allegedly sailed the waters within the 12-mile-zone limit. The only purpose for which vessels are permitted to enter Baltic sea ports occasionally is for coaling, states an April 17 American consular dispatch from Bremen.

It is believed that the pursuits of Scandinavian and West German fishing vessels is carried out partly for the reason of enforcing respect of the Soviet's newly created 12-mile-zone limit and to keep foreign vessels out of these waters.





## United Kingdom

BRITISH DEVELOPING NEW RADAR DEVICE WHICH INDICATES SPECIES OF FISH: Tests with a new radar device which enables fishermen to tell what species of fish they have located are being carried out at the British Ministry of Agriculture Fisheries Research Station at Lowestoft, reports the April 8 British fishery periodical, The Fishing News.

Tests are not yet complete, a Ministry spokesman stated in April, but results so far obtained are said to be promising. At present, only experts using the Hughes apparatus (as the new device is called) can tell what species of fish have been located from the image appearing on the radar screen. However, experiments are continuing in an attempt to discover how the radar image can be more easily interpreted. Success should enable trawler skippers to decide if they can "shoot" for prime fish and if the catch is likely to prove profitable before beginning a drag.

Other English manufacturers, expert in radar development, are claiming to have evolved similar devices, but the Ministry states: "Our experts tell us that none of these firms can tell us anything we do not know already."

The Ministry believes that the new apparatus may be ready for general use by the end of this year.

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RESULTS OF DECONTROL OF FISH PRICES: Great Britain's price controls on fish were discontinued on April 15, 1950. The immediate results of decontrol were some sensational price increases, in many cases prices more than doubling, reports an April 18 American Embassy dispatch from London. However, members of trade have stated that this is just a temporary situation and that a more moderate price situation will prevail shortly when consumers refuse to pay high prices and when more fish are available. The catch in the last few weeks has been adversely affected by stormy weather.

Later reports indicate that prices have already receded from their high levels of April 15, and in some cases have even been reported lower than controlled prices.



## Venezuela

SPINY-LOBSTER-FISHING CLOSED SEASON LENGTHENED: The closed season on spiny lobster (Palinurus argus) fishing is fixed as May 15 to September 15 in Venezuela, according to a May 9 American consular report from Caracas. This new closed season was announced by the Bureau of Agricultural Economics of the Ministry of Agriculture in Gaceta Oficial of May 5, 1950. Since 1947 the closed season has been lengthened from two months to the currently established four-month period.

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Venezuelan Fish Production (Marketed or Processed Weight), 1945-49 <sup>1/</sup>				
Year	Fresh	Salted	Canned	Total
	... (in metric tons).....			
1949	33,968	10,237	6,552	50,757
1948	39,380	13,440	9,280	62,100
1947	29,080	11,777	7,479	48,336
1946	22,968	13,541	7,791	44,300
1945	15,353	13,089	6,023	34,465

<sup>1/</sup> Issued by the statistical service of the Venezuelan Ministry of Fomento.

FISHERIES PRODUCTION, 1949: Production of fishery products in Venezuela dropped from 92,281 metric tons (landed weight) in 1948 to 75,449 tons (landed weight) in 1949, according to the Venezuelan Development Corporation. The drop in 1949 is attributed partly to the loss of markets for canned sardines, which resulted in the fish canners drastically curtailing their purchases of sardines, reports a May 3 American consular dispatch from Caracas.



### FISHING INDUSTRY IN BRAZIL

Fishing in Brazil is little developed as an industry, and is of relatively small economic importance. There is much subsistence fishing, wherever there is water; but fish is imported into all parts of Brazil, both canned and salted. The value of fish caught in Brazil in 1942 amounts to less than one-half of one percent of the Brazilian national income for 1942, and to about one-tenth of the value of U. S. fisheries products in 1939.

Primitive methods of fishing prevail throughout the country. The tropical coasts abound with fish, but the varieties are so numerous that large schools of a single species are rarely encountered; thus it is difficult if not impossible to employ large-scale methods. In the sub-tropical waters off the southern coasts, roughly from the Federal District to the Uruguayan border, it is possible to use the trawler and purse seine which are found so profitable in the northern oceans. Such an industry would be based on sardines and shrimp.

Efforts to develop the fishing industry during the past ten years have been sporadic and, usually, fruitless. The number of motor-powered fishing boats is small and so is the average horsepower of their engines. Few of them have any refrigerating equipment, and fuel is expensive.

--Fishery Leaflet 329





by the interdepartmental trade-agreements organization. Actual granting of concessions will depend, of course, upon the results of the negotiations themselves.

Negotiations may involve the elimination, reduction, or continuation of preferential tariff treatment for products of Cuba, with regard to any item on either of the published lists which is not the subject of such preferential treatment.



## Eighty-first Congress (Second Session)

MAY 1950

Listed below are public bills, resolutions, etc., introduced and referred to committees, or passed by the Eighty-First Congress (Second Session) and signed by the President during May 1950, which affect in any way the fisheries and fishing and allied industries. Public bills, resolutions, etc., are mentioned under this section only when introduced and, if passed, when they are signed by the President.

### PUBLIC BILLS AND RESOLUTIONS INTRODUCED AND REFERRED TO COMMITTEES:

#### Senate:

S. 3680 (Magnuson) - A bill to provide for the conservation of natural fish resources and for an adequate and balanced flow of fish and fish products in interstate and foreign commerce, and for other purposes; to the Committee on Interstate and Foreign Commerce. (This bill has three parts: Price Support, Fisheries Stabilization Corporation Creation, and Marketing Agreements and Orders.)

#### House of Representatives:

H. R. 8310 (Miller) - A bill to abolish free transmission of official Government mail matter under the penalty privilege; to the Committee on Post Office and Civil Service.

H. R. 8312 (Nicholson) - A bill to provide for an adjustment of the Federal Unemployment Tax Act according to the needs of the fishing industry; to the Committee on Ways and Means. (This bill adjusts the Federal Unemployment Tax Act of 1939 and provides that fishing vessel payments for a berth shall be considered as payments to an individual, and that taxes paid for a berth shall be apportioned among all employers of the berth's occupants during a calendar year. Also provides for a refund to employers for taxes paid on berth payments, including wages, exceeding \$3,000 a year, and retroactive to 1939.)

H. R. 8320 (Cooley) - A bill to encourage the improvement and development of marketing facilities for handling perishable agricultural commodities; to the Committee on Agriculture. (This bill also applies to sea food terminal markets, both combined with other perishable agricultural commodities or

solely established for the distribution of sea food. Provides insurance of loans made to private persons, groups, or municipalities for the purpose of establishing terminal marketing facilities of perishable agricultural commodities, and direct loans in cases where these cannot be obtained from a source other than the Federal Government. Sea food in this bill is listed as one of the perishable agricultural commodities.)

H. R. 8349 (Mitchell) - A bill to authorize deductions from the wages of seamen for payment into employee welfare funds; to the Committee on Merchant Marine and Fisheries.

H. Res. 576 (Shelley) - Resolution requesting the Secretary of State to investigate the seizure of five fishing vessels of the United States by the Republic of Mexico; to the Committee on Merchant Marine and Fisheries.



#### EXPLORATORY FISHING EXPEDITION TO THE NORTHERN BERING SEA IN JUNE AND JULY, 1949

Commercial fishing for cod has been carried on in southeastern Bering Sea for a number of years, and recently several vessels have been engaged in fishing for king crabs in the waters just north of the Alaska Peninsula, where large populations of crabs were found by the Alaskan King Crab Investigation in 1940 and 1941.

A Fish and Wildlife Service exploratory fishing expedition to the northern Bering Sea in June-July 1949 found that king crabs were widely scattered and of a much smaller size than those found to the south. Both the Alaskan and purple species were taken, and although no great quantities were found, it is possible that a more thorough survey might reveal areas of concentration.

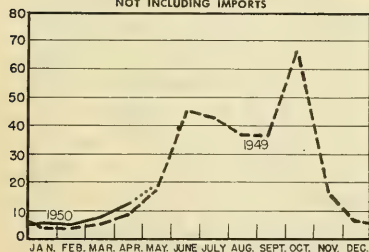
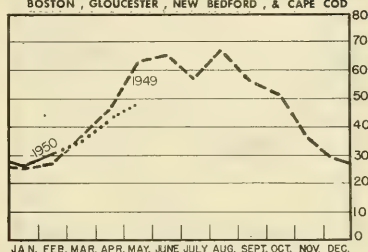
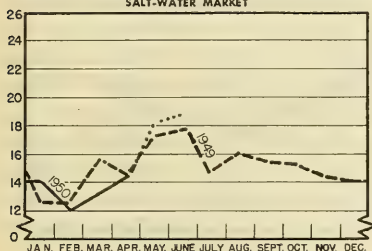
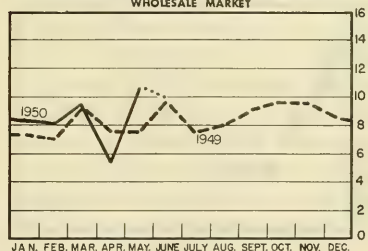
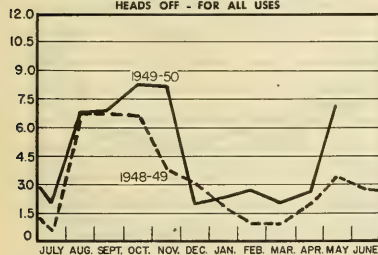
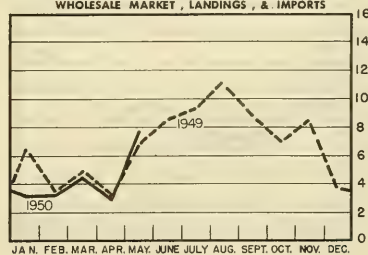
Five species of shrimp were caught, mainly in the waters around St. Lawrence Island and the approaches to Norton Sound. Considering the large mesh of the trawl net used, the numbers of gray shrimp taken may be considered sufficient to justify further investigation with gear more suitable for shrimp fishing. Numerous immature flounders were taken in Norton Sound and in the approaches to the Sound, which was considered evidence of the existence of a population of adult fish in the general area.

The waters to the west and south of Nunivak Island produced the best cod and flatfish catches, many drags containing several thousand pounds of marketable fish, including prime lemon, yellowfin, rock and flathead "soles."

--Fishery Leaflet 369

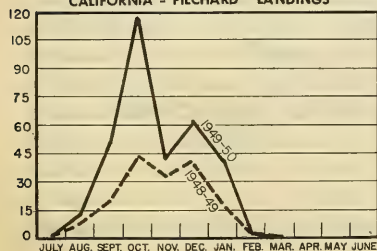
## LANDINGS AND RECEIPTS

In Millions of Pounds

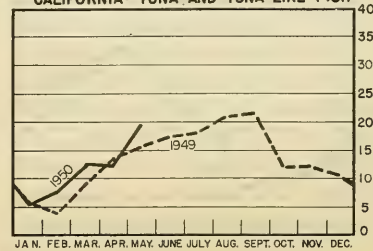
MAINE - LANDINGS  
NOT INCLUDING IMPORTSMASSACHUSETTS - LANDINGS  
BOSTON, GLOUCESTER, NEW BEDFORD, & CAPE CODNEW YORK CITY - RECEIPTS OF FRESH & FROZEN FISH  
SALT-WATER MARKETCHICAGO - RECEIPTS OF FRESH & FROZEN FISH  
WHOLESALE MARKETGULF - SHRIMP LANDINGS  
HEADS OFF - FOR ALL USESSEATTLE - RECEIPTS OF FRESH & FROZEN FISH  
WHOLESALE MARKET, LANDINGS, & IMPORTS

In Thousands of Tons

CALIFORNIA - PILCHARD LANDINGS



CALIFORNIA - TUNA AND TUNA-LIKE FISH



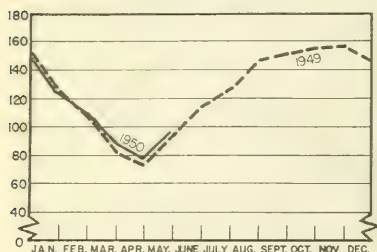
\*\*\*\*\* ESTIMATED



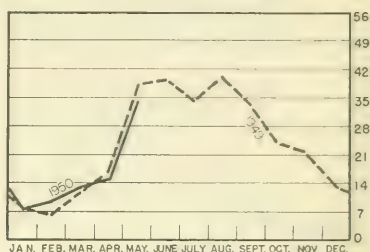
## COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

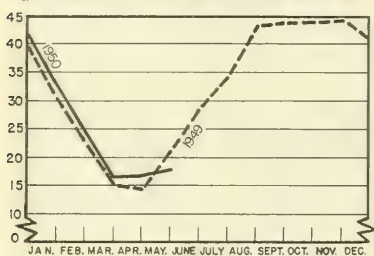
U.S. &amp; ALASKA - HOLDINGS OF FROZEN FISH



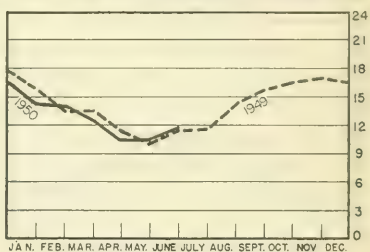
U.S. &amp; ALASKA - FREEZINGS



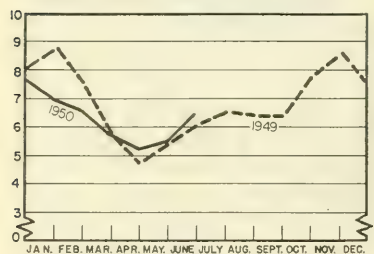
NEW ENGLAND - HOLDINGS OF FROZEN FISH



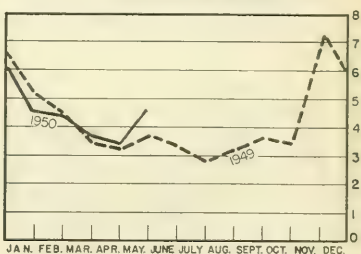
NEW YORK CITY - HOLDINGS OF FROZEN FISH



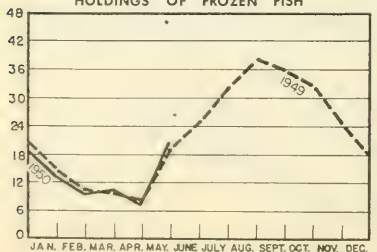
CHICAGO - HOLDINGS OF FROZEN FISH



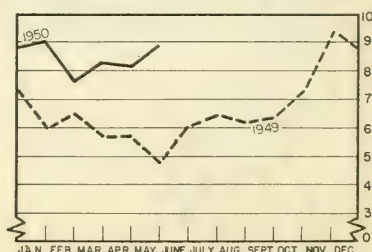
GULF - HOLDINGS OF FROZEN FISH



WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH

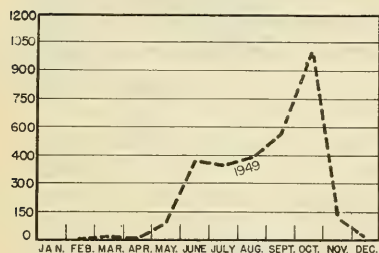


CALIFORNIA - HOLDINGS OF FROZEN FISH

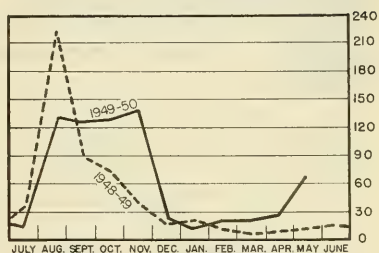


## CANNED FISHERY PRODUCTS

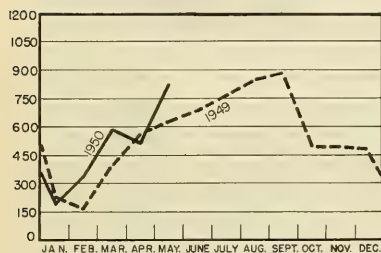
MAINE - SARDINES, ESTIMATED PACK



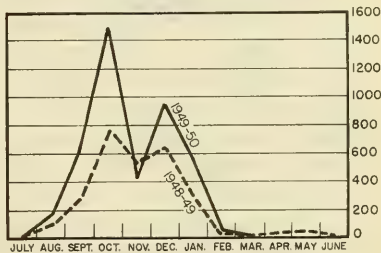
UNITED STATES - SHRIMP



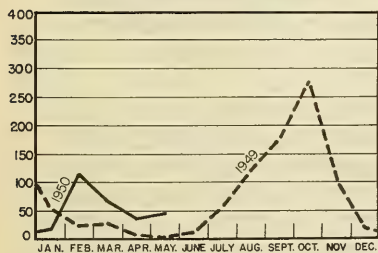
CALIFORNIA - TUNA AND TUNA-LIKE FISH



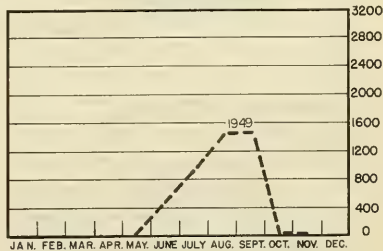
CALIFORNIA - PILCHARDS



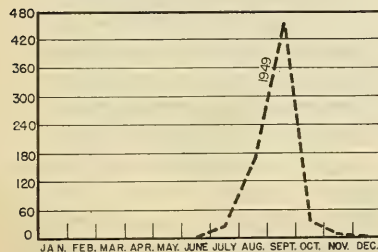
CALIFORNIA - MACKEREL



ALASKA - SALMON



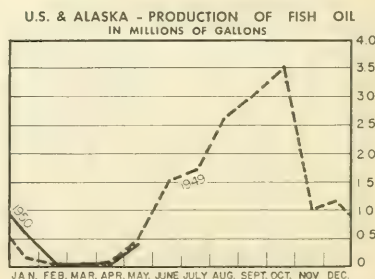
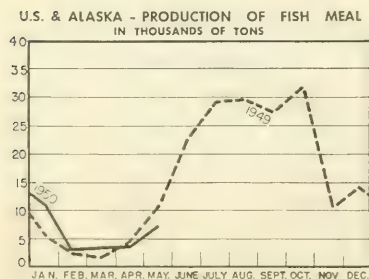
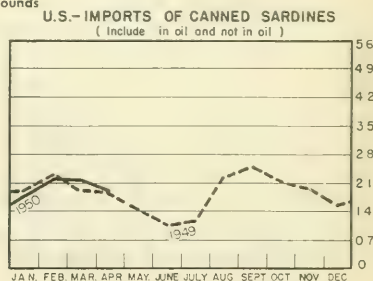
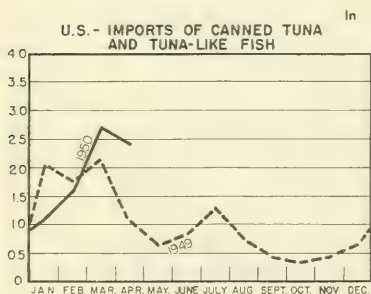
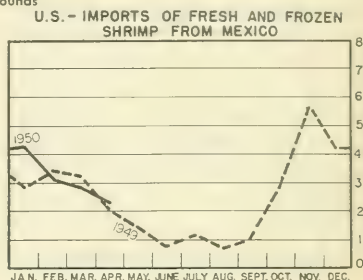
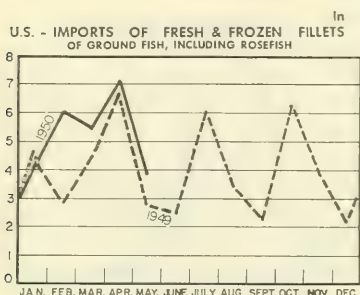
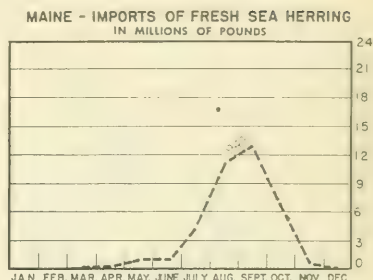
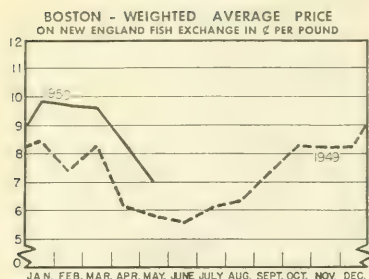
WASHINGTON - PUGET SOUND SALMON



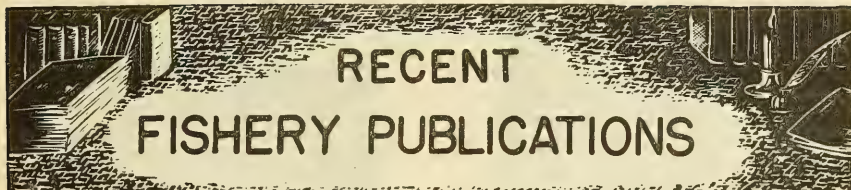
## STANDARD CASES

Variety	No. Cans	Can Designation	Net. Wgt.
SARDINES	100	1/4 drawn	3 1/4 oz.
SHRIMP	48	—	5 oz.
TUNA	48	No. 1/2 tuna	7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
MACKEREL	48	No. 300	15 oz.
SALMON	48	1-pound tall	16 oz.

## PRICES, IMPORTS and BY-PRODUCTS







Recent publications of interest to the commercial fishing industry are listed below.

### FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.  
FL - FISHERY LEAFLETS.  
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

SSR-FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).  
SSR-WILD. - SPECIAL SCIENTIFIC REPORTS--WILDLIFE (LIMITED DISTRIBUTION).

Number	Title
CFS-536	- Fisheries of the United States and Alaska, 1947 Annual Summary, 12 p.
CFS-539	- Manufactured Fishery Products, 1947 Annual Summary, 8 p.
CFS-540	- Fish Meal and Oil, March 1950, 2 p.
CFS-541	- Maine Landings, February 1950, 4 p.
CFS-542	- Texas Landings, March 1950, 4 p.
CFS-543	- Massachusetts Landings, by Ports, 1949 Annual Summary, 16 p.
CFS-544	- Maine Landings, 1949 Annual Summary, 6 p.
CFS-545	- Massachusetts Landings, January 1950, 12 p.
CFS-547	- Maine Landings, March 1950, 4 p.
FL -367	- The Codfish Industry in Northern Portugal, 24 p.

Sep.-249 - The Japanese Long-Line Fishery for Tunas.

SSR-Fish. No. 13--The Rational Exploitation of the Sea Fisheries with Particular Reference to the Fish Stock of the North Sea, by Dr. G. P. Baerends, Biologist of the Netherlands Institute for Fishery Research, 102 p., illus., March 1950. (Translated from the Dutch, Paper No. 36 of the Department of Fisheries, Ministry of Agriculture, Fishery and Food Supply, The Hague, Netherlands, July 1947). This paper is a comprehensive analysis of the vast amount of research work which has been done on the North Sea fishery--the most seriously exploited fishery in the world. Since this fishery is one which may serve as an example of what to expect in the fisheries off the American east coast, where similar species are being increasingly sought, this English translation was edited and released by the Fish and Wildlife Service. The original work which the author has drawn on for his analysis all antedates World War II.

SSR-Fish. No. 16--Three Papers on the Stocks of Tuna in Japanese Waters, by Morisaburo Tauchi, 15 p., April 1950. A translation from Japanese of the following three papers: "On the Stock of *Thunnus orientalis* (Temminck & Schlegel);" "On the Stock of the Yellowfin Tuna *Neothunnus macropterus* (Temminck & Schlegel);" and "On the Stock of the Albacore, *Germo germo* (Lacepede)." The first paper, which is a study on the stock of black tuna (*Thunnus orientalis*) and for which the catch records for each body-weight class were utilized as bases, reports that the study showed that survival rate was .30 for young fish, but .75 for the adults, while the fishing rate was .55 for the young but .10 for the adults. The second paper is a study on the stock of yellowfin tuna based on the catch records given for each body-length and body-weight classes. If the natural mortality rate is assumed to be .20, the paper points out that the survival rate is known to be .75 for young fish but .57 for the adults, while

the fishing rate is known to be .06 for the young but .29 for the adults. The third paper is a study on the stock of albacore on the basis of catch records classified according to the body length and body weight. Survival rate was estimated to be about .66, while fishing rate was about .18, according to this paper.

SSR-Fish. No. 17--Report of Investigations of Skipjack and Tuna Resources, 19 p, April 1950. A translation from Japanese. A number of skipjack studies were made during 1947 by the Nakamura Research Staff of the Japanese Fisheries Experimental Station. Part I of this publication is a study of the catch from the waters off Omaezaki. Part II consists of data on the fishing grounds of the Satsunan Area which were collected at Aburatsubo.

SSR-Fish. No. 18--Spawning Grounds of Tuna and Skipjack, April 1950. A translation from Japanese. This paper consists of two parts: A symposium on the investigation of tuna and skipjack spawning grounds; and A contribution to the study of tuna spawning grounds by Kenzo Ikebe.

SSR-Fish. No. 19--Larval and Juvenile Tunas and Skipjacks, by Kamakichi Kishinouye, 14 p., illus., April 1950. A translation from Japanese. This report consists of three papers: (1) An outline of studies of the Plecostei (Tuna and Skipjack) in 1925; (2) The larval and juvenile stages of the Plecostei; and (3) Observations on the skipjack fishing grounds.

SSR-Fish. No. 21--Age Determination of Fish (Preliminary Report), by Hiroaki Aikawa and Masuo Kato, 22 p., illus., April 1950. A translation from Japanese. Describes how the ages of black tuna (Thunnus orientalis, Temminck & Schlegel), yellowfin tuna (Neothunnus macropterus, Temminck & Schlegel), albacore (Germo germo, Lacepede), and skip-

jack (Katsuwonus vagans, Lesson) were determined.

SSR-Fish. No. 23--The Food Habits of Yellowfin Tuna NEOTHUNNUS MACROPTERUS (Schlegel) from the Celebes Sea, by Hiroshi Nakamura, 8 p., illus., April 1950. A translation from Japanese. This is a report of the study of the food habits of the yellowfin tuna taken by the Japanese research vessel Shonan Maru of the Taiwan Government-General Fisheries Experiment Station in the course of exploratory fishing in the Celebes Sea. Collections of stomachs were made at two different times--in February 1933 and from July to September 1934. According to the author, the conclusion can be reached from this study: "that through a study of the food of the yellowfin tuna it is possible to gain some knowledge concerning the migrations and population fluctuations of a part of the fauna of the Celebes Sea."

SSR-Fish. No. 24--A Study of the Mackerels, Cybiids, and Tunas, by Kamakichi Kishinouye, 14 p., May 1950. A translation from Japanese. A study of tunas and bonitos started in 1912 and reported upon in 1915. As a result of this study, the author reports: "there are two species of mackerel, five species of cybiids, two species of Oriental bonito, five species of tuna, and four species of bonito, a total of ten genera and 18 species, which occur in Japanese waters, and that these may be suitably divided into three families, the Scombridae, Cybiidae, and Thunnidae."

SSR-Wild. No. 4--Experiments in the Marking of Seals and Sea-lions, by Victor B. Scheffer, 33 p., illus., April 1950. Experiments in the marking of seals, sea-lions, and fur seals in the North Atlantic, North Pacific, and Antarctic regions are reviewed in this paper for study purposes. Results of certain studies of the northern fur seal, especially the series from 1940 to 1949 carried out by Government agents on the Pribilof Islands, Alaska, are also discussed.

\* \* \* \*

THE FOLLOWING SERVICE PUBLICATION IS AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED IN THE REVIEW.

Observations on Gonad Development, Spawning and Setting of Oysters and Starfish in Long Island Sound, Bulletin No. 2, vol. 14, June 6, 1950, 2 p., mimeo., free. (Available upon request from the Fishery Biological Laboratory, Fish and Wildlife Service, Milford, Conn.) First of this year's series of special bulletins issued periodically each oyster season for information of oyster growers.

The bulletins will discuss the accumulation of spawn in oysters during the prespawning and spawning periods, beginning of spawning of the oyster population at different depths of Long Island Sound, numbers of oyster larvae found in samples, occurrence of first oyster set, and intensity of oyster set at different sections of the Sound during the summer. Similar observations will also be made on starfish.

\* \* \* \*

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

On the Effectiveness of Spermatozoa of the Pink Salmon (ONCORHYNCHUS GORBUSCHA) at Varying Distances from Point of Dispersal, by Richard F. Shuman, Fishery Bulletin 50 (From Fishery Bulletin of the Fish and Wildlife Service, Volume 51), 5 p., printed, 10 cents.

Description of a Projection Device for Use in Age Determination from Fish Scales, by Kenneth H. Mosher, Fishery Bulletin 51 (From Fishery Bulletin of the Fish and Wildlife Service, Volume 51), 3 p., printed, illus., 10 cents.

\* \* \*

## ARTICLES BY FISH AND WILDLIFE SERVICE AUTHORS IN OTHER PUBLICATIONS

"Spawning of Oysters at Low Temperatures," by Victor L. Loosanoff and Harry C. Davis, Science, May 12, 1950, vol. 111, no. 2889, pp. 521-2. American Association for the Advancement of Science, Washington 5, D. C., single copies of periodical 25 cents. This is a report on observations on mass spawning of oysters (Ostrea virginica) at a comparatively low temperature made at the Fish and Wildlife Service Milford Laboratory. The authors report that their laboratory observations indicate that by conditioning oysters for a long period at a temperature just high enough for maturation of the gonads it is possible to induce spawning without an increase in temperature, thus bringing together, or to virtually the same level, the temperatures needed for ripening of gonads and for spawning.

"On Interspecific Hybridization in Ostrea," by Harry C. Davis, Science, May 12, 1950, vol. 111, no. 2889, p. 522. (See previous review for address and price of

periodical.) In view of numerous attempts to introduce the Japanese oyster (Ostrea gigas) to the Atlantic Coast, it is important to determine whether this species will cross with the native oyster (Ostrea virginica). The study reported upon in this article was to determine whether the hybrid larvae would continue to develop normally and would finally metamorphose by the methods now standard at the Fish and Wildlife Service Milford Laboratory for rearing larvae to metamorphosis. Crosses of O. virginica eggs with O. lurida were also tried, but the experiments were necessarily confined to attempts to fertilize O. virginica eggs with O. lurida spermatozoa, because many individuals of the latter species, in addition to being larviparous, are also hermaphroditic, and one cannot, therefore, be certain of exclusion of their spermatozoa. The general conclusion of the study was that no evidence of successful fertilization or of development was observed in the crosses attempted with the species of oysters used in the study.

\* \* \*

## MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE AGENCIES ISSUING THEM.

"Atlantic Seals Surveyed from the Air," article, Trade News, April 1950, vol. 2, no. 10, pp. 11-2, processed, illus. Canadian Department of Fisheries, Ottawa, Canada. Contains a description of the first aerial photographic survey of the herds of migratory Arctic seals riding the ice-fields in the Gulf of St. Lawrence and off the east coast of Newfoundland conducted by the Fisheries Research Board of Canada

through its Atlantic Biological Station at St. Andrews, N. B. Concern over the condition and possible depletion of the seal herds and the possible effects of sealing on the supply for native people in the Arctic led to this research program on the numbers, movements, and biology of the seal herds. This aerial photographic survey, conducted during the winter of 1949-50, was an experimental attempt to obtain information which could



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enable an estimate to be made of the numbers of harp seals in the whelping patches on the ice fields. Detailed examination of the photographs has not yet been completed, but the method appears to be promising, and indications are that estimates of the sizes of the seal herds will be quite encouraging—showing a population well up in the hundreds of thousands.

The Bakong Trolling Lure, 3 p., illus., processed. U. S. Fish and Wildlife Service and the Philippine Bureau of Fisheries, Manila, 1949. Among the more effective trolling baits tried in the experimental fishing operations of the Philippine Fishery Program of the U. S. Fish and Wildlife Service has been a lure made from a native plant (bakong) that has been demonstrated to have certain unique advantages for this purpose. This leaflet describes how to make a bakong lure, and the materials needed.

California Sharks and Rays, by Phil M. Roedel and Wm. Ellis Ripley, Fish Bulletin No. 75, 88 p., illus., printed. Bureau of Marine Fisheries, Division of Fish and Game, San Francisco, Calif., 1950. Purpose of this bulletin is to answer the recurring questions about sharks and rays and the fishery for them in California, and to provide a guide to the species known from California. The section which discusses the California shark fishery includes a description of the various types of fishing methods—gill nets, otter trawls, harpooning, and hook and line. Among the important sharks discussed are soupfin, dogfish, basking shark, and bonito shark. This booklet also contains common and scientific names, a key to the species known from California, and descriptions and illustrations.

Canning Technology, by A. J. Howard, 287 p., illus., printed, \$8.00. J. & A. Churchill Ltd., 104 Gloucester Place, W1, London, England, 1949. This book not only describes the methods and processes used in the food canning industry, but also provides an account of the fundamental considerations upon which modern canning technology is based. Although fishery products are not covered specifically in any one section, this book should serve as an excellent reference text for food-canning student and processor. The broad scope of the book is indicated by the following chapter headings: Historical Introduction; The Manufacture of Tin Plate; Corrosion Phenomena; Can Manufacture; Some General Considerations in Establishing a Cannery; The Examination and Preparation of Raw Materials for Canning; Heat Sterilization; Filling, Exhausting, Closing, and Processing; Miscellaneous Operations;

Metals in Canned Foods; Spoilage in Canned Foods, and its Prevention; Some Recent Developments. Extensive references are given at the end of each chapter.

Eighth Annual Report of the Atlantic States Marine Fisheries Commission (To the Congress of the United States and to the Governors and Legislators of the Fifteen Compacting States), 48 p., printed. Atlantic States Marine Fisheries Commission, 11 West Prospect Ave., Mt. Vernon, N. Y., 1950. In addition to reporting the highlights of the Commission's work during 1949, this report goes into details regarding the various programs in the various sections. Under the North Atlantic section of the report, problems are discussed regarding lobsters, striped bass, haddock, clams, Atlantic salmon, Massachusetts shellfish survey, Maine herring fishery, sea scallops, yellowtail, dams on the Connecticut River, and the smelt fishery in Maine and New Hampshire. The Middle Atlantic section deals with striped bass, blue crab, fluke, shad in the Hudson and Delaware Rivers, the Delaware Bay situation, and disposal of acid waste at sea. Shad, blue crab research, hydrographic study, the Chesapeake Bay Authority, and fluctuations in abundance of fish in Chesapeake Bay are discussed under the Chesapeake Bay section. Under the South Atlantic section, the report describes programs on shrimp, research for sport fishing, new laboratory developments in the area, and the Miami Fisheries Institute. Other problems covered by the Commission are interstate comity and state jurisdiction, catch statistics, channel bass, the Reciprocal Warden Act, shellfish production, pollution in relation to the shell fisheries, fisheries education, Gulf and Pacific Coast developments, international treaties, amendment to the Atlantic States Marine Fisheries Compact, Commission on the Reorganization of the Executive Branch of the Government, and fisheries research. Included is a discussion and listing of state legislation needed in 1950-51.

The General Agreement on Tariffs and Trade (Supplementary Announcement), (Negotiations Beginning September 1950 Under the Trade Agreement Act of 1934 as Amended and Extended), Department of State Publication 3854, Commercial Policy Series 129, 18 p., processed, 10 cents. Department of State, Washington, D. C. (For sale by Superintendent of Documents, Washington 25, D. C.) This publication contains a supplementary notice of the United States' intention to negotiate, in addition to the 17 countries previously named, with six additional countries. Also included is a supplementary list of products to be considered at the trade-agreement negotiations to be held at Torquay, England, beginning September 28, 1950. In addition to the fishery products previously



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announced, this supplementary list contains other fishery products.

General Coverage of the Wage and Hour Provisions of the Fair Labor Standards Act of 1938, As Amended (Title 29, Chapter V, Code of Federal Regulations, Part 776, Subpart A—General), Interpretative Bulletin, 46 p., processed. Wage and Hour and Public Contracts Divisions, U. S. Department of Labor, Washington, D. C., May 1950. The Fair Labor Standards Act of 1938, as amended, brings within the general coverage of its wage and hours provisions every employee who is "engaged in commerce or in the production of goods for commerce." What employees are so engaged must be ascertained in the light of the definitions of "commerce," "goods," and "produced" which are set forth in the Act as amended by the Fair Labor Standards Amendments of 1949, giving due regard to authoritative interpretations by the courts and to the legislative history of the Act, as amended. Interpretations of the Administrator of the Wage and Hour Division with respect to this general coverage are given in this publication to provide "a practical guide to employers and employees as to how the office representing the public interest in its enforcement will seek to apply it." These interpretations, with respect to the general coverage of the wage and hours provisions of the Act, indicate the construction of the law which the Administrator believes to be correct and which will guide him in the performance of his administrative duties under the Act unless and until he is otherwise directed by authoritative decisions of the courts or concludes, upon re-examination of an interpretation, that it is incorrect.

Greece—A Businessman's Manual and Directory on Trading with Greece, American Edition, 145 p., printed. Prepared by the Foreign Trade Administration, Ministry of National Economy, Athens, Greece, January 1950. (Available from the Economic Cooperation Administration, Washington, 25, D. C.) A publication designed to facilitate the further development of trade relationships between the businessmen of Greece and the United States. Covers government organizations concerned with foreign trade, banking services and practices, transport and communication facilities, foreign suppliers representation in Greece, government purchasing agencies and procedures, and foreign trade procedures and practices. Included is a directory of importers and manufacturers. Importers of fishing equipment, fish oils, and food stuffs

(including fishery products) are included, as well as a list of sponge exporters. Summaries of economic information, together with general data, and trade regulations and resumes of export and import procedures are to be found in this book. This is the second publication prepared at the request of ECA's Office of Small Business designed to assist American business firms. The first one issued, Italian Importers of U. S. Commodities, is also available from ECA.

Inshore Flounder Dragging, by F. D. McCracken and W. R. Martin, Circular, General Series, No. 17, 4 p., printed, illus. Atlantic Biological Station, Fisheries Research Board of Canada, St. Andrews, N. B., Canada, April 1950. Describes the winter flounder fishery of the Maritimes—a new industry with potentialities for further development, according to the authors. Information on fishing methods—hand line, spear, and weir, as well as otter trawling or dragging is given. A discussion of the advantages of flounder dragging and consideration of objections to flounder dragging is also included. Explains the exploratory inshore flounder investigations carried on by the Fisheries Research Board of Canada. The authors state that the good market demand, the development of new fishing methods, the discovery of new concentrations of flounders and the results of biological investigations all show that the potential inshore flounder fishery is as yet only poorly developed.

Japanese Fishing Fleet Statistics, 1948, by Sara D. Presby, Preliminary Study No. 38, 26 p., illus., processed. Natural Resources Section, Supreme Commander for the Allied Powers, Tokyo, May 16, 1950. (Reports may be purchased in photostat or microfilm from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.) This is a preliminary study prepared from the Japanese Fisheries Agency publication, Statistic Tables of Fishing Vessels, General Report No. 1 as of End of 1948. In the data presented in this publication, the vessels are divided into two general classifications: powered and nonpowered. Then there is a further subdivision by type of fishery. Statistics on the total fishing fleet by type of fishery, by prefectures, and by fishing vessels of five gross tons or more on tidal waters are given, as well as a comparison of fishing vessels and reported catch. Sketches of a whale catcher boat, sailing trawler, fish carrier, sardine purse-seine vessel, tuna and skipjack vessel, otter trawler, bull trawler, row boat, small motorboat, and Antarctic whaling factory ship are included.

Livestock Wealth of Pakistan, Marketing Series, 73 p., printed, (in English). Cooperation & Marketing Adviser, Government of Pakistan,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE,  
BUT USUALLY MAY BE OBTAINED FROM THE AGENCIES ISSUING THEM.

Karachi, 1949. Contains a chapter which discusses the production of fisheries products in Pakistan, and gives all available catch and marketing information.

The Marketing of Virginia Seafood; Volume 1, pp. 1-83, Volume 2, pp. 84-155; processed. Prepared for Committee on Fisheries and Committee on Markets and Marketing by Charles L. Quittmeyer. The Advisory Council on the Virginia Economy, March 1950. A study which gives a general picture of the marketing structure of Virginia sea-food products, some of the problems involved, some suggested marketing opportunities, and fields for further study. Discusses markets, supply, distribution, costs and prices, and sales promotion. According to the author, profitable merchandising and promotion of Virginia sea food in the future will probably depend more and more on how closely the distribution of the Virginia product can be adapted to modern retail methods of intensive distribution of reasonably-priced foods. Mass distribution of food products is facilitated by packaging, standardization, and the use of brands, with the accruing advantages of ease of handling, storing, and promoting. If Virginia seafoods are to meet these requirements, continues the author, they must be further processed by curing, canning, wrapping, bottling, quick-freezing, and packaging. Since palatability is the most important characteristic of most sea-food products, quick freezing and freezing to preserve flavor and freshness are the keys to consumer demand for Virginia's fisheries products.

"Neue Wege in der Fischkonservierung" (New Fish Canning Machinery), article, *Die Fischwaren-und Feinkostindustrie*, February 1950, no. 2, pp. 53-54, printed, illus., in German. Elbe-Weser-Verlag, Dr. Seyfarth & Co., Bremerhaven, Germany. Describes the new fish canning machinery developed by Karl Hartmann K. G., Kiel, Germany. The canning machinery described takes open cans containing washed, salted, and cleaned fish, and cooks, dehydrates and oil-impregnates the fish in the cans. The cooking of the fish is done by infrared rays rather than by steam or smoke. In addition, the machines seal, sterilize, and label the cans. Machinery is still in the process of development.

Operation of the Trade Agreements Program (Second Report, April 1948-March 1949), Report No. 163, Second Series, 85 p., printed, 25 cents. United States

Tariff Commission, Washington, D. C., 1950. (For sale by the Superintendent of Documents, Washington 25, D. C.) This is a report prepared in conformity with Executive Order 10004 issued October 5, 1948. It discusses the developments respecting the general agreement on tariffs and trade, initiation of trade-agreement negotiations in 1948, changes or proposed changes in tariffs of foreign countries affecting the operation of the trade agreements program, nontariff import controls of foreign countries with which the United States has trade agreements, and action by the United States regarding import controls. Although fishery products are not specifically mentioned, it will be of interest to those concerned with the imports and exports of fishery products.

Orders of the Director of Fisheries (Washington), General Order No. 256, 121 p., processed. Department of Fisheries, State of Washington, Seattle, Washington. (In order that only pertinent sections of the regulations may be furnished, inquirers are requested to specify the type of gear and specific area of the State of particular interest to them, and whether the commercial or non-commercial regulations are desired.) The new regulations affect all branches of the food fish and shellfish fisheries of the State of Washington. This new Order wholly replaces previous General Orders No. 189 and 190. Regulations are, in general, listed by area and by fishery.

A Report on the Capture, Transportation and Marketing of Live Spiny Lobster in the Philippines, by Harry B. Hinkle, 36 p., processed. Philippine Fishery Program, Philippine Bureau of Fisheries and the U. S. Fish and Wildlife Service, Manila, R. P., April 1950. Summarizes extensive experiments carried out by the American Mission during the past year and a half in an effort to determine if it would be possible to establish a lobster fishery in the Philippines. Attempts were made to capture spiny lobsters by the techniques employed in other parts of the world, but none of them would work in the Philippines. Most of the spiny lobsters were taken by Filipino divers using only their hands or a small net.

Republic of the Philippines Import Control Law (Republic Act 426), 18 p., processed, free. Office of International Trade, U. S. Department of Commerce, Washington 25, D. C., June 1950. This is the full text of the Import Control Law signed by the President of the Philippines on May 22 which provides for a reduction in the Philippine imports of certain specific commodities (including fishery and allied products), sets import quotas, and requires ship-

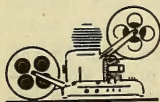
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pers to the Philippines to obtain import licenses for the importation of any commodity.

Study of Species of Fish of Particular Interest to Sports Anglers of the Atlantic Coast (Hearings before the Subcommittee on the Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, Eighty-First Congress, Second Session, January 25, 1950, on H. R. 986), 39 p., printed. Available only from the House Committee on Merchant Marine and Fisheries until exhausted. This publication contains the statements presented at the hearings on H. R. 986. This is a bill authorizing and directing the United States Fish and Wildlife Service to undertake a continuing study of species of fish of particular interest to sports anglers of the Atlantic Coast, with respect to the biology, propagation, catch records, and abundance of such species to the end that such Service may recommend to the several states of the Atlantic Coast through the Atlantic States Marine Fisheries Commission appropriate measures for increasing the abundance of such species and promoting the wisest utilization thereof.

Third Biennial Report (Louisiana), 1948-49, 372 p., illus., printed. Department of Wild Life and Fisheries, New Orleans, La., 1950. A portion of this publication contains reports on Louisiana's fresh- and salt-water fisheries, the Division of Fish and Game, and the Division of Oysters and Water Bottoms. Activities and conditions in the commercial fresh- and salt-water fish and shrimp industry of Louisiana are covered for fiscal years 1947-48 and 1948-49, and in some instances for the calendar years 1948 and 1949. Data on production and values (in some instances) are reported for fresh- and salt-water fish and shellfish, together with comparative data. In addition to a biological research report on oysters, a report on the effect of the 1950 opening of the Bonnet Carré Spillway on Mississippi Sound is also included.

United States Canned Crabmeat Production and Imports from U.S.S.R., by M. W. Wallar, Foods and Related Agricultural Products, World Trade in Commodities, May 1950, vol. VIII, part 6-7-8, sup. no. 11, 3 p., processed. Office of International Trade, Department of Commerce, Washington 25, D. C. A discussion of the United States imports of crab meat by countries. Imports by countries for 1946 through 1949, compared with the 1937-39 average, are also given.



### FISHERY MOTION PICTURE

The following motion picture is available  
only from the source given in listing.



Food for Thought, 16 mm. color and sound, running time 14 minutes. Produced by the Fish and Wildlife Service, June 1950. This film deals with the school-lunch program and the use of fish in planning menus. Basic purpose of this new movie is to develop an increased appreciation of the fact that well-prepared and attractively served fish tempts appetites and aids in achieving a nutritional balance in children's diets. While specifically directed to school-lunch managers, it is also appropriate for showing to PTA groups, housewives, civic organizations, and to school classes at all levels. Most of the sequences were filmed in New York State, with the school sequences being made at Hartsdale Junior High





A SCENE FROM THE FILM FOOD FOR THOUGHT. SCHOOL LUNCH MANAGER AND STUDENT GROUP PLANNING MENUS FOR THEIR SCHOOL LUNCHES AT THE HARTSDALE JUNIOR HIGH SCHOOL, HARTSDALE, N. Y.

School, Hartsdale, N. Y. Filletting and packaging scenes were shot at Gloucester, Mass. Prints of this film are being loaned on a long-term basis to public film libraries in over 35 states. It can also be borrowed directly from the DIVISION OF INFORMATION, FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. Requests for booking the film should be made as far in advance as possible. Requests will be handled in order of receipt. Each request should indicate clearly the address to which the shipment is to be made. Shipments are usually made by express, the borrower paying transportation charges both ways, but there is no charge for the use of the film.

This new movie is available for telecasting. Applications for television showings should be addressed to the Branch of Commercial Fisheries, Fish and Wildlife Service, Washington 25, D. C.



### EDIBLE FISH IN THE PERSIAN GULF

The only important fish processing plant in Southern Iran is the Government-owned canning factory at Bandar Abbas. This plant was constructed in 1940 by a Danish company for the Iranian Government and began operations in 1941. It is a portable plant made of asbestos and is said to have a capacity of five tons of fish per eight-hour shift. Under present management, however, the plant is canning only sardines, of which the average annual production is only about 50 to 60 metric tons. The sardines canned in this plant are packed in olive oil produced in Iran.

--Fishery Leaflet 304



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## FISHING INDUSTRY OF THE GULF OF ADEN (ARABIA)

For many centuries along the southern coast of Arabia, whose shores are washed by the waters of the Gulf of Aden and the Indian Ocean, fishing has been a casual industry, one whose production methods are most primitive, but whose potentialities are believed great. There are none of the intense production methods which characterize this industry in the United States or the Scandinavian countries--powered vessels, packing houses, fish reduction plants--but rather, primarily, there is seen being utilized the primitive canoe, some very small dhows, and hand equipment. Actual production figures have never been compiled, but it is known that while most of the fish caught is used for local consumption, many shipments of dried and salted fish are sent irregularly into the hinterlands, to Ceylon and India, and to the British Somaliland coast.

--Fishery Leaflet 328

Processing -- Miscellaneous Service Division

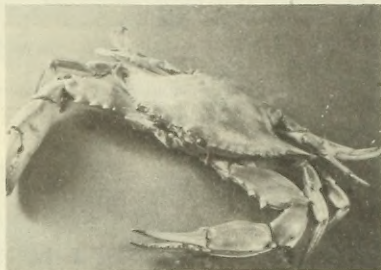
Illustrator -- Gustaf T. Sundstrom

Compositors -- Jean Zalevsky, Betty Cady,  
Carolyn Wood

## THE CHESAPEAKE BAY CRAB INDUSTRY

A description of the crab industry in the Chesapeake Bay area is to be found in Fishery Leaflet 358, The Chesapeake Bay Crab Industry.

This 13-page leaflet, which supersedes Separate 191 (a reprint from Commercial Fisheries Review, December 1947, pages 1-9), is divided into three parts: methods of capture, marketing, and canning and by-products.



The various methods of capturing blue crabs are described and include the dip net, push net, crab scrape, crab fyke, crab haul seine, crab pot, crab dredge, and the trotline. The section on marketing discusses the buy boat, the shedding house, and the crab-picking house. The canning and byproducts section gives some information on the extent of canning and the byproducts produced by the crab industry.

In his introduction, the author states that the crab industry of the Chesapeake Bay area, though one of the youngest seafood industries on the Atlantic Coast, ranks high in importance.

For a free copy of Fishery Leaflet 358 write directly to the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

128 D Chevy Chase, Md.

114 N. Thornapple St.

Robert H. Gibbs

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